FCC Test Report

(PART 27)

Report No.: RFBGSN-WTW-P20080589-2

FCC ID: NKS-PA1

Test Model: Trimble Gateway-PA1

Received Date: Aug. 29, 2020

Test Date: Sep. 23, 2020 ~ Oct. 17, 2020

Issued Date: Oct. 28, 2020

Applicant: PeopleNet Communications Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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FCC Registration / Designation Number: 788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RFBGSN-WTW-P20080589-2	Original Release	Oct. 28, 2020

1 Certificate of Conformity

Product: Trimble Gateway NA

Brand: Trimble

Test Model: Trimble Gateway-PA1

Sample Status: Engineering Sample

Applicant: PeopleNet Communications Corporation

Test Date: Sep. 23, 2020 ~ Oct. 17, 2020

Standards: FCC Part 27, Subpart C, H, L

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Vera Huang , **Date:** Oct. 28, 2020

Vera Huang / Specialist

Approved by : , **Date:** Oct. 28, 2020

Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2 (WCDMA)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(d)(4)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -23.85 dB at 5257.80 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 4)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(d)(4)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -17.54 dB at 5160.00 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 12)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 27.50(c)(10)	Equivalent Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
---	Peak to Average Ratio	Pass	Meet the requirement of limit.
27.53(g)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -25.48 dB at 43.58 MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2020	Mar. 17, 2021
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 12, 2019	Dec. 11, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 24, 2019	Nov. 23, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 08, 2019	Nov. 07, 2020
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	9120D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 25, 2019	Oct. 24, 2020
Preamplifier EMCI	EMC001340	980201	Oct. 14, 2019	Oct. 13, 2020
			Oct. 21, 2020	Oct. 20, 2021
Preamplifier EMCI	EMC 012645	980115	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
Preamplifier EMCI	EMC 330H	980112	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable EMCI	EMC104-SM-SM-8000	180409	Jan. 18, 2020	Jan. 17, 2021
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 08, 2019	Oct. 07, 2020
			Oct. 07, 2020	Oct. 06, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Feb. 13, 2020	Feb. 12, 2021
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 19, 2019	Aug. 18, 2021
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 09, 2020	Sep. 08, 2021
DC Power Supply Topward	33010D	807748	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.

3 General Information

3.1 General Description of EUT

Product	Trimble Gateway NA	
Brand	Trimble	
Test Model	Trimble Gateway-PA1	
Status of EUT	Engineering Sample	
Power Supply Rating	12 Vdc (adapter)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM
Frequency Range	WCDMA	1712.4 ~ 1752.6 MHz
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1754.3 MHz
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1753.5 MHz
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1752.5 MHz
	LTE Band 4 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1750.0 MHz
	LTE Band 4 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1747.5 MHz
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1745.0 MHz
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	699.7 ~ 715.3 MHz
	LTE Band 12 (Channel Bandwidth: 3 MHz)	700.5 ~ 714.5 MHz
	LTE Band 12 (Channel Bandwidth: 5 MHz)	701.5 ~ 713.5 MHz
	LTE Band 12 (Channel Bandwidth: 10 MHz)	704.0 ~ 711.0 MHz
Emission Designator	WCDMA	4M16F9W
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09D7W
	LTE Band 4 (Channel Bandwidth: 3 MHz)	2M71G7D
	LTE Band 4 (Channel Bandwidth: 5 MHz)	4M50G7D
	LTE Band 4 (Channel Bandwidth: 10 MHz)	8M96D7W
	LTE Band 4 (Channel Bandwidth: 15 MHz)	13M4D7W
	LTE Band 4 (Channel Bandwidth: 20 MHz)	17M9G7D
	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	1M10D7W
	LTE Band 12 (Channel Bandwidth: 3 MHz)	2M71D7W
	LTE Band 12 (Channel Bandwidth: 5 MHz)	4M50D7W
	LTE Band 12 (Channel Bandwidth: 10 MHz)	8M99G7D
Max. ERP Power (Mode A)	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	90.16 mW
	LTE Band 12 (Channel Bandwidth: 3 MHz)	97.72 mW
	LTE Band 12 (Channel Bandwidth: 5 MHz)	102.57 mW
	LTE Band 12 (Channel Bandwidth: 10 MHz)	104.23 mW
Max. ERP Power (Mode B)	LTE Band 12 (Channel Bandwidth: 1.4 MHz)	139.00 mW
	LTE Band 12 (Channel Bandwidth: 3 MHz)	146.89 mW
	LTE Band 12 (Channel Bandwidth: 5 MHz)	155.24 mW
	LTE Band 12 (Channel Bandwidth: 10 MHz)	159.59 mW

Max. EIRP Power (Mode A)	WCDMA	458.14 mW
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	399.94 mW
	LTE Band 4 (Channel Bandwidth: 3 MHz)	412.10 mW
	LTE Band 4 (Channel Bandwidth: 5 MHz)	419.76 mW
	LTE Band 4 (Channel Bandwidth: 10 MHz)	443.61 mW
	LTE Band 4 (Channel Bandwidth: 15 MHz)	451.86 mW
	LTE Band 4 (Channel Bandwidth: 20 MHz)	465.59 mW
Max. EIRP Power (Mode B)	WCDMA	280.54 mW
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	246.04 mW
	LTE Band 4 (Channel Bandwidth: 3 MHz)	248.89 mW
	LTE Band 4 (Channel Bandwidth: 5 MHz)	252.35 mW
	LTE Band 4 (Channel Bandwidth: 10 MHz)	267.92 mW
	LTE Band 4 (Channel Bandwidth: 15 MHz)	276.69 mW
	LTE Band 4 (Channel Bandwidth: 20 MHz)	283.79 mW
Antenna Type	Refer to Note as below	
Accessory Device	N/A	
Data Cable Supplied	N/A	

Note:

1. The information of module collocated in this EUT is listed as below.

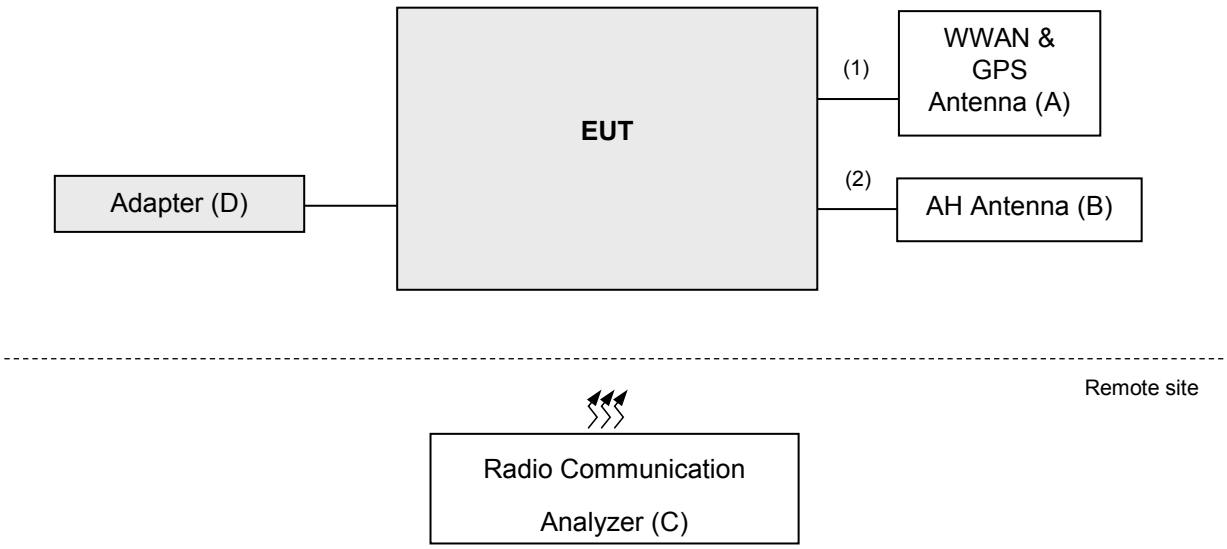
Product	Brand	Model
BT/WLAN Module	msi	BM25
WWAN Module	Quectel	EC25-A
AH Module	silex	SX-NEWAH

2. The antenna information is listed as below.

Ant.	Brand	Model	Antenna Type	Antenna Gain (dBi)		Remark
				WCDMA 4 / LTE 4	LTE 12	
1	TAOGLAS	PCS.06.A	SMD Antenna	3.82	-0.03	Internal, Main Antenna
2	TAOGLAS	PCS.06.B	SMD Antenna	4.04	0.06	Internal, Aux. Antenna
3	TAOGLAS	MA240.LBI.001	Adhesive Mount Combination Antenna	1.93	1.6	External, Main Antenna
4	TAOGLAS	MA240.LBI.001	Adhesive Mount Combination Antenna	1.2	1.2	External, Aux. Antenna

3. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	WWAN & GPS Antenna	TAOGLAS	MA240.LBI.001	NA	NA	Provided by client
B	AH Antenna	TAOGLAS	IS.05.B.301111	NA	NA	Provided by client
C	Radio Communication Analyzer	ANRITSU	MT8821C	6201462755	ANRITSU	--
D	Adapter	TPT	PMW120300W8	NA	NA	Provided by client AC Input: 100-240V~, 50-60Hz, 1.1A MAX DC Output: 12V, 3.0A

Note:
1. All power cords of the above support units are non-shielded (1.8m).
2. Item C acted as a communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RF Cable	3	3	N	0	-
2.	RF Cable	1	3	N	0	-

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

EUT Configure Mode	Description
A	EUT + Antenna 1 & 2
B	EUT + Antenna 3 & 4

Band	EUT Configure Mode	ERP / EIRP	Radiated Emission
WCDMA	**A**	Z-plane	Z-plane
	B	Z-plane	Z-plane
LTE Band 4	**A**	Z-plane	Z-plane
	B	X-plane	X-plane
LTE Band 12	**A**	Z-plane	Z-plane
	B	Z-plane	Z-plane

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
A, B	EIRP	1312 to 1513	1312, 1413, 1513	WCDMA
-	Modulation Characteristics	1312 to 1513	1413	WCDMA
-	Frequency Stability	1312 to 1513	1312, 1513	WCDMA
-	Occupied Bandwidth	1312 to 1513	1312, 1413, 1513	WCDMA
-	Band Edge	1312 to 1513	1312, 1513	WCDMA
-	Peak to Average Ratio	1312 to 1513	1312, 1413, 1513	WCDMA
-	Conducted Emission	1312 to 1513	1312, 1413, 1513	WCDMA
A, B	Radiated Emission	1312 to 1513	1312, 1413, 1513	WCDMA

Note:

1. This device was tested under all modulations. The worst case of conducted output power was found in WCDMA modulation. Therefore, all test items were performed under WCDMA mode only.
2. For radiated emissions below 1 GHz, select the worst radiated emission channel (above 1GHz) for final testing.

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A, B	EIRP	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	20050 to 20300	20175	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Frequency Stability	19957 to 20393	19957, 20393	1.4 MHz	QPSK	6 RB / 0 RB Offset
		19965 to 20385	19965, 20385	3 MHz	QPSK	15 RB / 0 RB Offset
		19975 to 20375	19975, 20375	5 MHz	QPSK	25 RB / 0 RB Offset
		20000 to 20350	20000, 20350	10 MHz	QPSK	50 RB / 0 RB Offset
		20025 to 20325	20025, 20325	15 MHz	QPSK	75 RB / 0 RB Offset
		20050 to 20300	20050, 20300	20 MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK, 16QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	19957 to 20393	19957	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			20393	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		19965 to 20385	19965	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			20385	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		19975 to 20375	19975	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			20375	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		20000 to 20350	20000	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			20350	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		20025 to 20325	20025	15 MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			20325	15 MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset
		20050 to 20300	20050	20 MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			20300	20 MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
-	Conducted Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset
A, B	Radiated Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only EIRP, modulation characteristics, occupied bandwidth and peak to average ratio items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel (above 1GHz) for final testing

LTE Band 12

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A, B	ERP	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	23060 to 23130	23095	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Frequency Stability	23017 to 23173	23017, 23173	1.4 MHz	QPSK	6 RB / 0 RB Offset
		23025 to 23165	23025, 23165	3 MHz	QPSK	15 RB / 0 RB Offset
		23035 to 23155	23035, 23155	5 MHz	QPSK	25 RB / 0 RB Offset
		23060 to 23130	23060, 23130	10 MHz	QPSK	50 RB / 0 RB Offset
-	Occupied Bandwidth	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Peak to Average Ratio	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Band Edge	23017 to 23173	23017	1.4 MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			23173	1.4 MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		23025 to 23165	23025	3 MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			23165	3 MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		23035 to 23155	23035	5 MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			23155	5 MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		23060 to 23130	23060	10 MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			23130	10 MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
-	Conducted Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025, 23095, 23165	3 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 0 RB Offset
A, B	Radiated Emission	23017 to 23173	23017, 23095, 23173	1.4 MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035, 23095, 23155	5 MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060, 23095, 23130	10 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP, modulation characteristics, occupied bandwidth and peak to average ratio items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel (above 1GHz) for final testing.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	26 deg. C, 58 % RH	12 Vdc	Cyril Chen / Tim Chen
Modulation Characteristics	26 deg. C, 58 % RH	12 Vdc	Getaz Yang
Frequency Stability	26 deg. C, 58 % RH	12 Vdc	Getaz Yang
Occupied Bandwidth	26 deg. C, 58 % RH	12 Vdc	Getaz Yang
Band Edge	26 deg. C, 58 % RH	12 Vdc	Getaz Yang
Peak to Average Ratio	26 deg. C, 58 % RH	12 Vdc	Getaz Yang
Conducted Emission	26 deg. C, 58 % RH	12 Vdc	Getaz Yang
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Cyril Chen / Tim Chen

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards and references

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:
FCC 47 CFR Part 2
FCC 47 CFR Part 27
ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.

References Test Guidance:
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-E 2016

Note: All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.
Portable stations (hand-held device) operating in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

4.1.2 Test Procedures

EIRP / ERP Measurement:

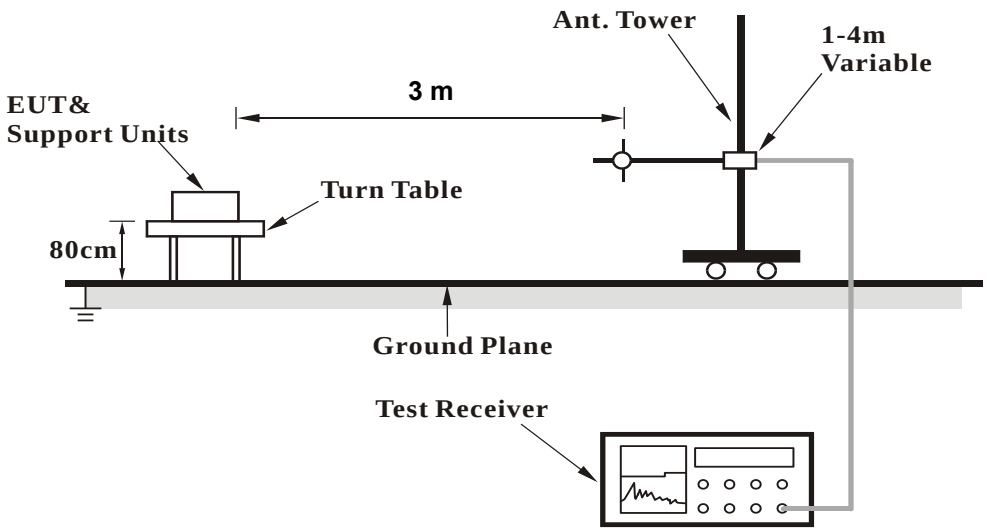
a. All measurements were done at low, middle and high operational frequency range. RBW is 5 MHz for WCDMA and 1.4 MHz、3 MHz、5 MHz、10 MHz 、15 MHz 、20 MHz for LTE mode, and VBW ≥ 3 x RBW.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB.

Conducted Power Measurement:

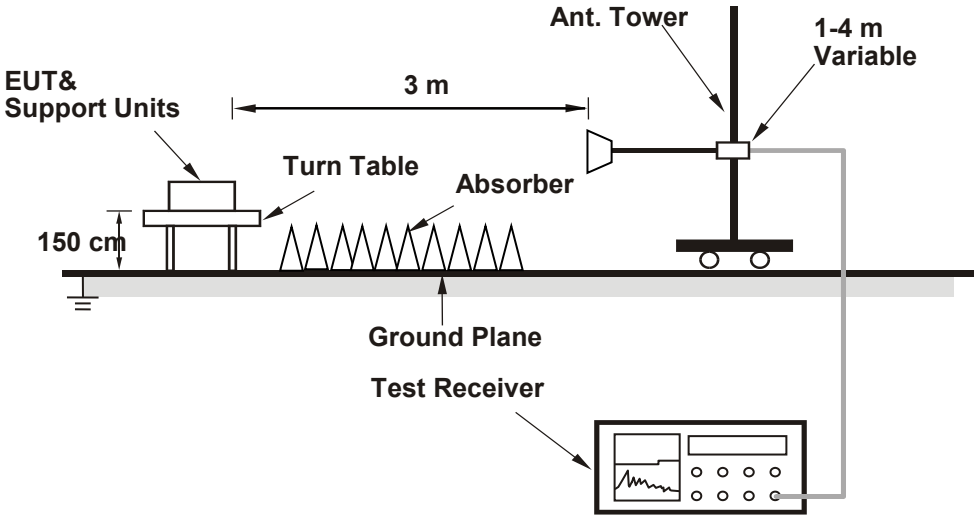
a. The EUT was set up for the maximum power with WCDMA and LTE link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

EIRP / ERP Measurement:
<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	22.51	22.47	22.57
HSDPA Subtest-1	21.65	21.61	21.64
HSDPA Subtest-2	21.61	21.58	21.61
HSDPA Subtest-3	21.54	21.51	21.54
HSDPA Subtest-4	21.51	21.50	21.51
HSUPA Subtest-1	21.61	21.58	21.61
HSUPA Subtest-2	19.58	19.60	19.64
HSUPA Subtest-3	20.63	20.64	20.66
HSUPA Subtest-4	19.54	19.50	19.56
HSUPA Subtest-5	21.56	21.54	21.55

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19957	Mid Ch 20175	High Ch 20393		Low Ch 19957	Mid Ch 20175	High Ch 20393	
			1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz	
4 / 1.4M	1	0	21.82	21.99	21.97	0	20.87	20.99	20.82	1
	1	2	21.77	21.84	21.87	0	20.60	20.74	20.95	1
	1	5	21.47	21.82	21.75	0	20.48	20.56	20.63	1
	3	0	21.65	21.68	21.77	0	20.50	20.60	20.82	1
	3	1	21.35	21.73	21.60	0	20.34	20.40	20.50	1
	3	3	21.52	21.59	21.65	0	20.38	20.42	20.66	1
	6	0	20.70	20.89	20.78	1	19.82	19.85	19.65	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19965	Mid Ch 20175	High Ch 20385		Low Ch 19965	Mid Ch 20175	High Ch 20385	
			1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz	
4 / 3M	1	0	21.96	22.12	22.10	0	20.84	21.00	21.07	1
	1	7	21.79	21.98	22.10	0	20.80	20.91	20.93	1
	1	14	21.71	21.78	21.81	0	20.52	20.69	20.73	1
	8	0	20.89	20.95	21.00	1	19.77	19.82	19.87	2
	8	3	20.65	20.64	20.82	1	19.53	19.71	19.64	2
	8	7	20.49	20.77	20.69	1	19.52	19.48	19.76	2
	15	0	20.77	20.82	20.97	1	19.73	19.80	19.89	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 19975	Mid Ch 20175	High Ch 20375		Low CH 19975	Mid CH 20175	High CH 20375	
			1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz	
4 / 5M	1	0	21.99	22.16	22.16	0	21.05	21.09	21.16	1
	1	12	21.97	22.02	22.08	0	20.99	21.03	21.02	1
	1	24	21.82	21.85	21.88	0	20.77	20.81	20.92	1
	12	0	21.06	21.01	21.07	1	19.95	19.96	19.98	2
	12	6	20.75	20.79	20.86	1	19.72	19.86	19.83	2
	12	13	20.67	20.86	20.85	1	19.64	19.73	19.77	2
	25	0	21.00	21.05	21.11	1	19.89	19.99	19.96	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 20000	Mid Ch 20175	High Ch 20350		Low Ch 20000	Mid Ch 20175	High Ch 20350	
			1715.0 MHz	1732.5 MHz	1750.0 MHz		1715.0 MHz	1732.5 MHz	1750.0 MHz	
4 / 10M	1	0	22.20	22.32	22.39	0	21.11	21.19	21.29	1
	1	24	22.09	22.15	22.22	0	21.07	21.24	21.28	1
	1	49	21.98	22.12	22.17	0	20.99	21.04	20.94	1
	25	0	21.07	21.21	21.31	1	20.04	20.07	20.20	2
	25	12	20.91	20.99	21.04	1	19.79	19.84	20.08	2
	25	25	20.84	20.94	20.93	1	19.73	19.80	19.83	2
	50	0	21.06	21.08	21.25	1	19.94	19.98	20.13	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 20025	Mid Ch 20175	High Ch 20325		Low Ch 20025	Mid Ch 20175	High Ch 20325	
			1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz	
4 / 15M	1	0	22.34	22.43	22.52	0	21.31	21.43	21.44	1
	1	37	22.16	22.32	22.35	0	21.20	21.21	21.37	1
	1	74	22.10	22.11	22.24	0	20.97	21.11	21.24	1
	36	0	21.21	21.37	21.37	1	20.22	20.17	20.35	2
	36	19	21.01	21.13	21.16	1	19.96	20.10	20.18	2
	36	39	20.97	21.05	21.01	1	19.86	19.99	20.06	2
	75	0	21.15	21.23	21.31	1	20.18	20.27	20.30	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 20050	Mid Ch 20175	High Ch 20300		Low Ch 20050	Mid Ch 20175	High Ch 20300	
			1720.0 MHz	1732.5 MHz	1745.0 MHz		1720.0 MHz	1732.5 MHz	1745.0 MHz	
4 / 20M	1	0	22.46	22.56	22.62	0	21.39	21.47	21.55	1
	1	50	22.32	22.47	22.49	0	21.26	21.40	21.44	1
	1	99	22.20	22.28	22.35	0	21.06	21.11	21.23	1
	50	0	21.33	21.42	21.51	1	20.29	20.39	20.41	2
	50	25	21.11	21.24	21.34	1	20.10	20.19	20.25	2
	50	50	21.02	21.16	21.17	1	19.99	20.03	20.11	2
	100	0	21.31	21.45	21.40	1	20.18	20.33	20.52	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23017	Mid Ch 23095	High Ch 23173		Low Ch 23017	Mid Ch 23095	High Ch 23173	
			699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz	
12 / 1.4M	1	0	21.96	21.75	21.79	0	20.87	20.65	20.76	1
	1	2	21.92	21.60	21.69	0	20.75	20.44	20.66	1
	1	5	21.73	21.39	21.41	0	20.55	20.35	20.36	1
	3	0	21.82	21.50	21.54	0	20.68	20.27	20.54	1
	3	1	21.64	21.29	21.26	0	20.45	20.24	20.22	1
	3	3	21.67	21.41	21.40	0	20.62	20.11	20.41	1
	6	0	20.95	20.67	20.63	1	19.69	19.55	19.48	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23025	Mid Ch 23095	High Ch 23165		Low Ch 23025	Mid Ch 23095	High Ch 23165	
			700.5 MHz	707.5 MHz	714.5 MHz		700.5 MHz	707.5 MHz	714.5 MHz	
12 / 3M	1	0	22.25	21.97	22.05	0	21.14	20.92	21.07	1
	1	7	22.07	21.87	21.86	0	21.03	20.77	20.91	1
	1	14	21.96	21.65	21.64	0	20.72	20.59	20.69	1
	8	0	21.09	20.83	20.89	1	19.95	19.82	19.77	2
	8	3	20.97	20.57	20.63	1	19.79	19.70	19.72	2
	8	7	20.86	20.58	20.67	1	19.64	19.59	19.51	2
	15	0	21.02	20.73	20.87	1	20.02	19.81	19.75	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23035	Mid Ch 23095	High Ch 23155		Low Ch 23035	Mid Ch 23095	High Ch 23155	
			701.5 MHz	707.5 MHz	713.5 MHz		701.5 MHz	707.5 MHz	713.5 MHz	
12 / 5M	1	0	22.44	22.24	22.29	0	21.44	21.21	21.19	1
	1	12	22.29	22.13	22.13	0	21.30	21.04	21.04	1
	1	24	22.13	21.99	21.97	0	21.03	20.78	20.88	1
	12	0	21.33	21.04	21.13	1	20.14	20.03	19.97	2
	12	6	21.12	20.88	20.95	1	20.13	19.90	19.91	2
	12	13	21.04	20.85	20.84	1	20.03	19.79	19.79	2
	25	0	21.26	21.08	21.13	1	20.31	20.00	20.05	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low Ch 23060	Mid Ch 23095	High Ch 23130		Low Ch 23060	Mid Ch 23095	High Ch 23130	
			704.0 MHz	707.5 MHz	711.0 MHz		704.0 MHz	707.5 MHz	711.0 MHz	
12 / 10M	1	0	22.56	22.34	22.40	0	21.51	21.30	21.33	1
	1	24	22.47	22.21	22.25	0	21.44	21.21	21.19	1
	1	49	22.26	22.09	22.04	0	21.27	20.91	21.01	1
	25	0	21.41	21.20	21.28	1	20.33	20.04	20.29	2
	25	12	21.21	21.02	21.07	1	20.17	20.03	20.07	2
	25	25	21.17	20.96	21.03	1	20.08	19.89	19.98	2
	50	0	21.42	21.22	21.20	1	20.37	20.06	20.10	2

Mode A

ERP Power (dBm)

LTE Band 12							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Z	23017	699.7	-18.37	30.36	11.99	15.81	H
	23095	707.5	-17.80	30.17	12.37	17.26	
	23173	715.3	-17.56	30.17	12.61	18.24	
	23017	699.7	-13.31	32.03	18.72	74.47	V
	23095	707.5	-12.82	31.98	19.16	82.41	
	23173	715.3	-12.51	32.06	19.55	90.16	
Channel Bandwidth: 1.4 MHz / 16QAM							
Z	23017	699.7	-19.73	30.36	10.63	11.56	H
	23095	707.5	-19.11	30.17	11.06	12.76	
	23173	715.3	-18.68	30.17	11.49	14.09	
	23017	699.7	-14.28	32.03	17.75	59.57	V
	23095	707.5	-13.79	31.98	18.19	65.92	
	23173	715.3	-13.52	32.06	18.54	71.45	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 12							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Z	23025	700.5	-18.10	30.17	12.07	16.11	H
	23095	707.5	-17.66	30.17	12.51	17.82	
	23165	714.5	-17.25	30.18	12.93	19.63	
	23025	700.5	-12.90	31.96	19.06	80.54	V
	23095	707.5	-12.50	31.98	19.48	88.72	
	23165	714.5	-12.13	32.03	19.90	97.72	
Channel Bandwidth: 3 MHz / 16QAM							
Z	23025	700.5	-19.23	30.17	10.94	12.42	H
	23095	707.5	-18.81	30.17	11.36	13.68	
	23165	714.5	-18.41	30.18	11.77	15.03	
	23025	700.5	-13.95	31.96	18.01	63.24	V
	23095	707.5	-13.55	31.98	18.43	69.66	
	23165	714.5	-13.22	32.03	18.81	76.03	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 12							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	23035	701.5	-17.91	30.17	12.26	16.83	H
	23095	707.5	-17.48	30.17	12.69	18.58	
	23155	713.5	-17.17	30.18	13.01	20.00	
	23035	701.5	-12.69	31.96	19.27	84.53	V
	23095	707.5	-12.29	31.98	19.69	93.11	
	23155	713.5	-11.92	32.03	20.11	102.57	
Channel Bandwidth: 5 MHz / 16QAM							
Z	23035	701.5	-14.04	30.17	16.13	41.02	H
	23095	707.5	-13.60	30.17	16.57	45.39	
	23155	713.5	-13.19	30.18	16.99	50.00	
	23035	701.5	-13.77	31.96	18.19	65.92	V
	23095	707.5	-13.37	31.98	18.61	72.61	
	23155	713.5	-12.98	32.03	19.05	80.35	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 12							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	23060	704.0	-17.95	30.17	12.22	16.67	H
	23095	707.5	-17.50	30.17	12.67	18.49	
	23130	711.0	-17.06	30.18	13.12	20.51	
	23060	704.0	-12.62	31.96	19.34	85.90	V
	23095	707.5	-12.22	31.98	19.76	94.62	
	23130	711.0	-11.85	32.03	20.18	104.23	
Channel Bandwidth: 10 MHz / 16QAM							
Z	23060	704.0	-18.80	30.17	11.37	13.71	H
	23095	707.5	-18.38	30.17	11.79	15.10	
	23130	711.0	-17.96	30.18	12.22	16.67	
	23060	704.0	-13.65	31.96	18.31	67.76	V
	23095	707.5	-13.26	31.98	18.72	74.47	
	23130	711.0	-12.85	32.03	19.18	82.79	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

EIRP Power (dBm)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Z	1312	1712.4	-9.68	36.29	26.61	458.14	H
	1413	1732.6	-10.16	36.69	26.53	449.78	
	1513	1752.6	-10.51	36.98	26.47	443.61	
	1312	1712.4	-17.83	37.11	19.28	84.72	V
	1413	1732.6	-18.38	37.60	19.22	83.56	
	1513	1752.6	-18.48	37.65	19.17	82.60	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Z	19957	1710.7	-18.49	36.45	17.96	62.52	H
	20175	1732.5	-19.26	36.80	17.54	56.75	
	20393	1754.3	-19.82	36.94	17.12	51.52	
	19957	1710.7	-11.26	37.28	26.02	399.94	V
	20175	1732.5	-11.97	37.63	25.66	368.13	
	20393	1754.3	-12.37	37.64	25.27	336.51	
Channel Bandwidth: 1.4 MHz / 16QAM							
Z	19957	1710.7	-19.53	36.45	16.92	49.20	H
	20175	1732.5	-20.32	36.80	16.48	44.46	
	20393	1754.3	-20.91	36.94	16.03	40.09	
	19957	1710.7	-12.27	37.28	25.01	316.96	V
	20175	1732.5	-12.96	37.63	24.67	293.09	
	20393	1754.3	-13.39	37.64	24.25	266.07	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	19965	1711.5	-18.22	36.45	18.23	66.53	H
	20175	1732.5	-18.99	36.80	17.81	60.39	
	20385	1753.5	-19.57	36.94	17.37	54.58	
	19965	1711.5	-11.13	37.28	26.15	412.10	V
	20175	1732.5	-11.90	37.63	25.73	374.11	
	20385	1753.5	-12.33	37.64	25.31	339.63	
Channel Bandwidth: 3 MHz / 16QAM							
Z	19965	1711.5	-19.38	36.45	17.07	50.93	H
	20175	1732.5	-20.15	36.80	16.65	46.24	
	20385	1753.5	-20.71	36.94	16.23	41.98	
	19965	1711.5	-12.17	37.28	25.11	324.34	V
	20175	1732.5	-12.91	37.63	24.72	296.48	
	20385	1753.5	-13.29	37.64	24.35	272.27	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	19975	1712.5	-18.28	36.45	18.17	65.61	H
	20175	1732.5	-19.05	36.80	17.75	59.57	
	20375	1752.5	-19.63	36.94	17.31	53.83	
	19975	1712.5	-11.05	37.28	26.23	419.76	V
	20175	1732.5	-11.82	37.63	25.81	381.07	
	20375	1752.5	-12.22	37.64	25.42	348.34	
Channel Bandwidth: 5 MHz / 16QAM							
Z	19975	1712.5	-19.24	36.45	17.21	52.60	H
	20175	1732.5	-20.03	36.80	16.77	47.53	
	20375	1752.5	-20.58	36.94	16.36	43.25	
	19975	1712.5	-12.03	37.28	25.25	334.97	V
	20175	1732.5	-12.77	37.63	24.86	306.20	
	20375	1752.5	-13.19	37.64	24.45	278.61	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	20000	1715.0	-18.11	36.64	18.53	71.29	H
	20175	1732.5	-18.69	36.80	18.11	64.71	
	20350	1750.0	-19.07	36.80	17.73	59.29	
	20000	1715.0	-10.97	37.44	26.47	443.61	V
	20175	1732.5	-11.58	37.63	26.05	402.72	
	20350	1750.0	-11.98	37.64	25.66	368.13	
Channel Bandwidth: 10 MHz / 16QAM							
Z	20000	1715.0	-19.33	36.64	17.31	53.83	H
	20175	1732.5	-19.95	36.80	16.85	48.42	
	20350	1750.0	-20.39	36.80	16.41	43.75	
	20000	1715.0	-12.08	37.44	25.36	343.56	V
	20175	1732.5	-12.65	37.63	24.98	314.77	
	20350	1750.0	-13.09	37.64	24.55	285.10	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
Z	20025	1717.5	-17.83	36.45	18.62	72.78	H
	20175	1732.5	-18.56	36.80	18.24	66.68	
	20325	1747.5	-19.13	36.94	17.81	60.39	
	20025	1717.5	-10.73	37.28	26.55	451.86	V
	20175	1732.5	-11.47	37.63	26.16	413.05	
	20325	1747.5	-11.90	37.64	25.74	374.97	
Channel Bandwidth: 15 MHz / 16QAM							
Z	20025	1717.5	-19.09	36.45	17.36	54.45	H
	20175	1732.5	-19.83	36.80	16.97	49.77	
	20325	1747.5	-20.36	36.94	16.58	45.50	
	20025	1717.5	-11.80	37.28	25.48	353.18	V
	20175	1732.5	-12.54	37.63	25.09	322.85	
	20325	1747.5	-12.98	37.64	24.66	292.42	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 20 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Z	20050	1720.0	-17.92	36.45	18.53	71.29	H
	20175	1732.5	-18.66	36.80	18.14	65.16	
	20300	1745.0	-19.17	36.94	17.77	59.84	
	20050	1720.0	-10.60	37.28	26.68	465.59	V
	20175	1732.5	-11.39	37.63	26.24	420.73	
	20300	1745.0	-11.79	37.64	25.85	384.59	
Channel Bandwidth: 20 MHz / 16QAM							
Z	20050	1720.0	-18.77	36.45	17.68	58.61	H
	20175	1732.5	-19.56	36.80	17.24	52.97	
	20300	1745.0	-20.36	36.94	16.58	45.50	
	20050	1720.0	-11.71	37.28	25.57	360.58	V
	20175	1732.5	-12.44	37.63	25.19	330.37	
	20300	1745.0	-12.87	37.64	24.77	299.92	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

Mode B

ERP Power (dBm)

LTE Band 12							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Z	23017	699.7	-16.83	30.36	13.53	22.54	H
	23095	707.5	-16.21	30.17	13.96	24.89	
	23173	715.3	-15.80	30.17	14.37	27.35	
	23017	699.7	-11.36	32.03	20.67	116.68	V
	23095	707.5	-10.97	31.98	21.01	126.18	
	23173	715.3	-10.63	32.06	21.43	139.00	
Channel Bandwidth: 1.4 MHz / 16QAM							
Z	23017	699.7	-17.83	30.36	12.53	17.91	H
	23095	707.5	-17.19	30.17	12.98	19.86	
	23173	715.3	-16.76	30.17	13.41	21.93	
	23017	699.7	-12.34	32.03	19.69	93.11	V
	23095	707.5	-11.85	31.98	20.13	103.04	
	23173	715.3	-11.49	32.06	20.57	114.02	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 12							
Channel Bandwidth: 3 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
Z	23025	700.5	-16.31	30.17	13.86	24.32	H
	23095	707.5	-15.88	30.17	14.29	26.85	
	23165	714.5	-15.47	30.18	14.71	29.58	
	23025	700.5	-11.15	31.96	20.81	120.50	V
	23095	707.5	-10.74	31.98	21.24	133.05	
	23165	714.5	-10.36	32.03	21.67	146.89	
Channel Bandwidth: 3 MHz / 16QAM							
Z	23025	700.5	-17.60	30.17	12.57	18.07	H
	23095	707.5	-17.15	30.17	13.02	20.04	
	23165	714.5	-16.72	30.18	13.46	22.18	
	23025	700.5	-12.23	31.96	19.73	93.97	V
	23095	707.5	-11.84	31.98	20.14	103.28	
	23165	714.5	-11.45	32.03	20.58	114.29	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 12							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	23035	701.5	-16.16	30.17	14.01	25.18	H
	23095	707.5	-15.74	30.17	14.43	27.73	
	23155	713.5	-15.30	30.18	14.88	30.76	
	23035	701.5	-10.93	31.96	21.03	126.77	V
	23095	707.5	-10.51	31.98	21.47	140.28	
	23155	713.5	-10.12	32.03	21.91	155.24	
Channel Bandwidth: 5 MHz / 16QAM							
Z	23035	701.5	-17.14	30.17	13.03	20.09	H
	23095	707.5	-16.70	30.17	13.47	22.23	
	23155	713.5	-16.29	30.18	13.89	24.49	
	23035	701.5	-11.93	31.96	20.03	100.69	V
	23095	707.5	-11.49	31.98	20.49	111.94	
	23155	713.5	-11.11	32.03	20.92	123.59	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 12							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
Z	23060	704.0	-15.98	30.17	14.19	26.24	H
	23095	707.5	-15.55	30.17	14.62	28.97	
	23130	711.0	-15.18	30.18	15.00	31.62	
	23060	704.0	-10.71	31.96	21.25	133.35	V
	23095	707.5	-10.31	31.98	21.67	146.89	
	23130	711.0	-10.00	32.03	22.03	159.59	
Channel Bandwidth: 10 MHz / 16QAM							
Z	23060	704.0	-17.11	30.17	13.06	20.23	H
	23095	707.5	-16.69	30.17	13.48	22.28	
	23130	711.0	-16.26	30.18	13.92	24.66	
	23060	704.0	-11.88	31.96	20.08	101.86	V
	23095	707.5	-11.47	31.98	20.51	112.46	
	23130	711.0	-11.09	32.03	20.94	124.17	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB)

EIRP Power (dBm)

WCDMA							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
Z	1312	1712.4	-18.53	36.29	17.76	59.70	H
	1413	1732.6	-18.88	36.69	17.81	60.39	
	1513	1752.6	-19.10	36.98	17.88	61.38	
	1312	1712.4	-12.74	37.11	24.37	273.53	V
	1413	1732.6	-13.18	37.60	24.42	276.69	
	1513	1752.6	-13.17	37.65	24.48	280.54	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 1.4 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (mW)**	**Polarization (H/V)**
X	19957	1710.7	-19.57	36.45	16.88	48.75	H
	20175	1732.5	-20.37	36.80	16.43	43.95	
	20393	1754.3	-20.93	36.94	16.01	39.90	
	19957	1710.7	-13.37	37.28	23.91	246.04	V
	20175	1732.5	-14.15	37.63	23.48	222.84	
	20393	1754.3	-14.58	37.64	23.06	202.30	
Channel Bandwidth: 1.4 MHz / 16QAM							
X	19957	1710.7	-20.60	36.45	15.85	38.46	H
	20175	1732.5	-21.37	36.80	15.43	34.91	
	20393	1754.3	-21.98	36.94	14.96	31.33	
	19957	1710.7	-14.34	37.28	22.94	196.79	V
	20175	1732.5	-15.14	37.63	22.49	177.42	
	20393	1754.3	-15.63	37.64	22.01	158.85	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 3 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	19965	1711.5	-19.52	36.45	16.93	49.32	H
	20175	1732.5	-20.31	36.80	16.49	44.57	
	20385	1753.5	-20.86	36.94	16.08	40.55	
	19965	1711.5	-13.32	37.28	23.96	248.89	V
	20175	1732.5	-14.01	37.63	23.62	230.14	
	20385	1753.5	-14.45	37.64	23.19	208.45	
Channel Bandwidth: 3 MHz / 16QAM							
X	19965	1711.5	-20.51	36.45	15.94	39.26	H
	20175	1732.5	-21.29	36.80	15.51	35.56	
	20385	1753.5	-21.87	36.94	15.07	32.14	
	19965	1711.5	-14.31	37.28	22.97	198.15	V
	20175	1732.5	-15.11	37.63	22.52	178.65	
	20385	1753.5	-15.56	37.64	22.08	161.44	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	19975	1712.5	-19.52	36.45	16.93	49.32	H
	20175	1732.5	-20.29	36.80	16.51	44.77	
	20375	1752.5	-20.87	36.94	16.07	40.46	
	19975	1712.5	-13.26	37.28	24.02	252.35	V
	20175	1732.5	-14.02	37.63	23.61	229.61	
	20375	1752.5	-14.47	37.64	23.17	207.49	
Channel Bandwidth: 5 MHz / 16QAM							
X	19975	1712.5	-20.47	36.45	15.98	39.63	H
	20175	1732.5	-21.24	36.80	15.56	35.97	
	20375	1752.5	-21.83	36.94	15.11	32.43	
	19975	1712.5	-14.23	37.28	23.05	201.84	V
	20175	1732.5	-14.97	37.63	22.66	184.50	
	20375	1752.5	-15.41	37.64	22.23	167.11	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20000	1715.0	-19.45	36.64	17.19	52.36	H
	20175	1732.5	-20.03	36.80	16.77	47.53	
	20350	1750.0	-20.48	36.80	16.32	42.85	
	20000	1715.0	-13.16	37.44	24.28	267.92	V
	20175	1732.5	-13.77	37.63	23.86	243.22	
	20350	1750.0	-14.17	37.64	23.47	222.33	
Channel Bandwidth: 10 MHz / 16QAM							
X	20000	1715.0	-20.46	36.64	16.18	41.50	H
	20175	1732.5	-21.07	36.80	15.73	37.41	
	20350	1750.0	-21.49	36.80	15.31	33.96	
	20000	1715.0	-14.19	37.44	23.25	211.35	V
	20175	1732.5	-14.82	37.63	22.81	190.99	
	20350	1750.0	-15.27	37.64	22.37	172.58	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20025	1717.5	-19.07	36.45	17.38	54.70	H
	20175	1732.5	-19.83	36.80	16.97	49.77	
	20325	1747.5	-20.40	36.94	16.54	45.08	
	20025	1717.5	-12.86	37.28	24.42	276.69	V
	20175	1732.5	-13.67	37.63	23.96	248.89	
	20325	1747.5	-14.09	37.64	23.55	226.46	
Channel Bandwidth: 15 MHz / 16QAM							
X	20025	1717.5	-20.07	36.45	16.38	43.45	H
	20175	1732.5	-20.83	36.80	15.97	39.54	
	20325	1747.5	-21.43	36.94	15.51	35.56	
	20025	1717.5	-13.93	37.28	23.35	216.27	V
	20175	1732.5	-14.72	37.63	22.91	195.43	
	20325	1747.5	-15.12	37.64	22.52	178.65	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

LTE Band 4							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20050	1720.0	-18.98	36.45	17.47	55.85	H
	20175	1732.5	-19.77	36.80	17.03	50.47	
	20300	1745.0	-20.29	36.94	16.65	46.24	
	20050	1720.0	-12.75	37.28	24.53	283.79	V
	20175	1732.5	-13.51	37.63	24.12	258.23	
	20300	1745.0	-13.90	37.64	23.74	236.59	
Channel Bandwidth: 20 MHz / 16QAM							
X	20050	1720.0	-20.07	36.45	16.38	43.45	H
	20175	1732.5	-20.79	36.80	16.01	39.90	
	20300	1745.0	-21.31	36.94	15.63	36.56	
	20050	1720.0	-13.83	37.28	23.45	221.31	V
	20175	1732.5	-14.61	37.63	23.02	200.45	
	20300	1745.0	-15.01	37.64	22.63	183.23	

Note: EIRP (dBm) = Reading (dBm) + Correction Factor (dB)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

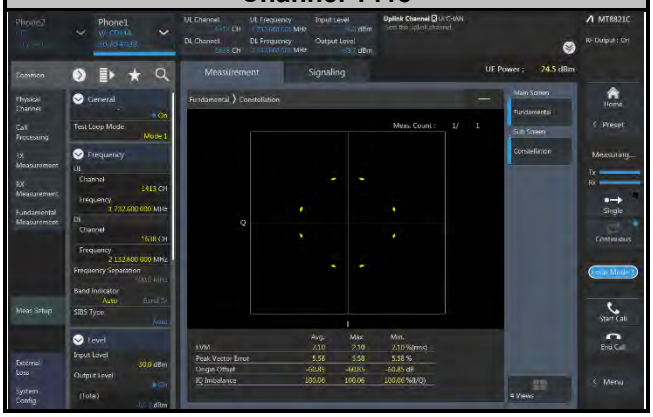
4.2.2 Test Setup

4.2.3 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector. The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.4 Test Results

Spectrum Plot of Measurement
WCDMA
Channel 1413

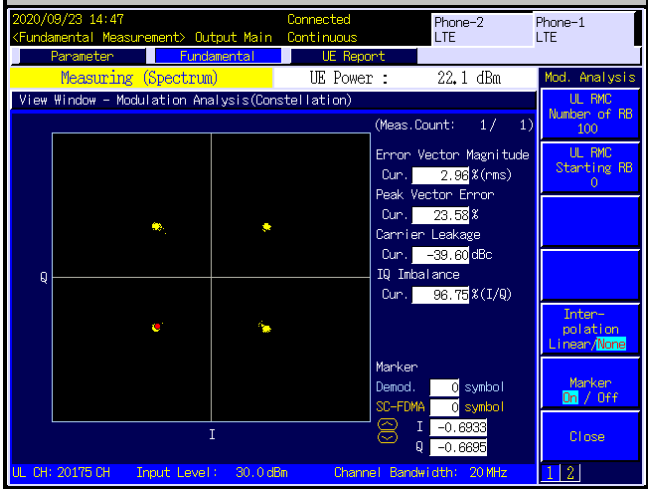


Spectrum Plot of Measurement

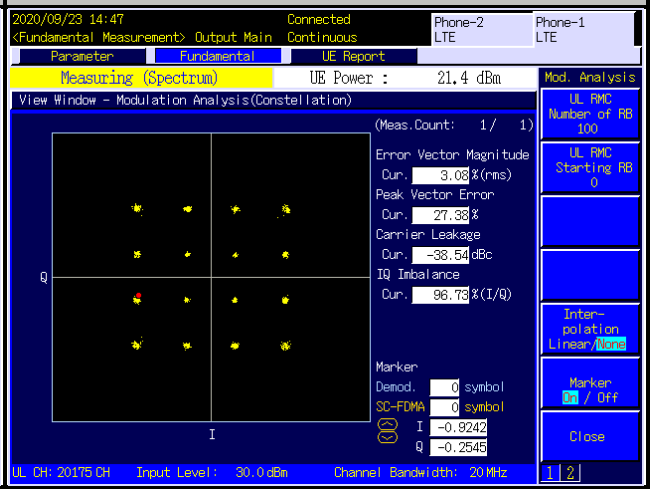
LTE Band 4

Channel 20175

QPSK



16QAM

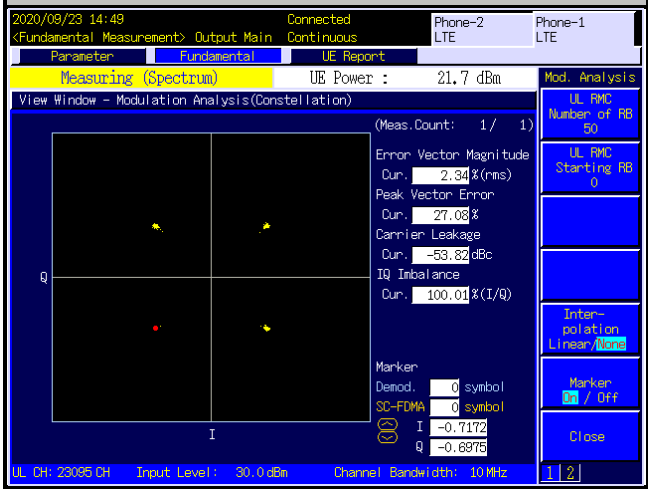


Spectrum Plot of Measurement

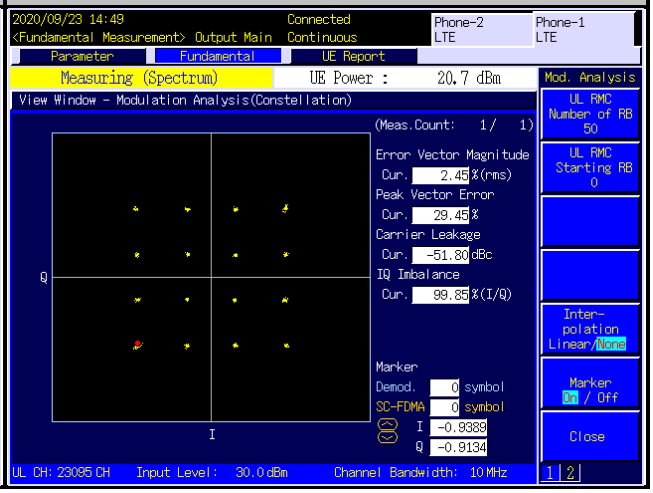
LTE Band 12

Channel 23095

QPSK



16QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

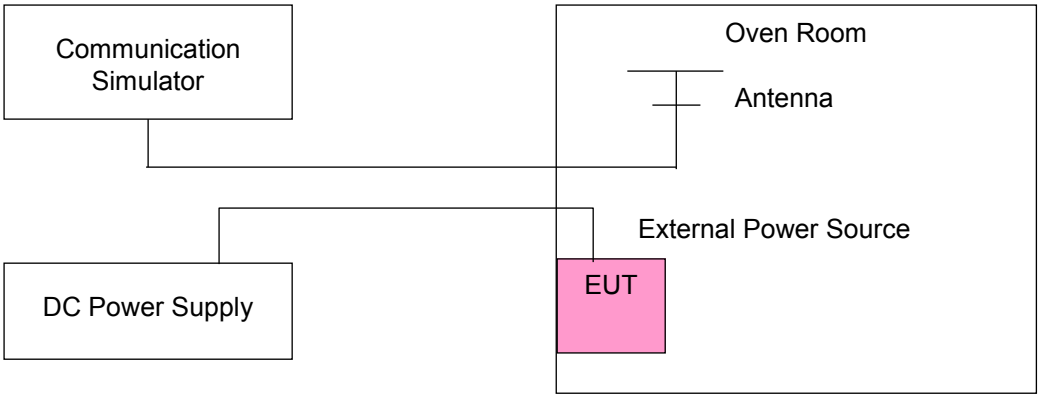
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.3.2 Test Procedure

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	1712.400002	0.001	1752.600002	0.001
10.2	1712.400002	0.001	1752.600003	0.002
13.8	1712.400004	0.002	1752.600004	0.002

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1712.400002	0.001	1752.600004	0.002
-30	1712.400002	0.001	1752.600002	0.001
-20	1712.400001	0.001	1752.600002	0.001
-10	1712.400001	0.001	1752.600001	0.001
0	1712.400003	0.002	1752.600002	0.001
10	1712.399997	-0.002	1752.599999	-0.001
20	1712.399997	-0.002	1752.599999	-0.001
30	1712.399997	-0.002	1752.599997	-0.002
40	1712.399999	-0.001	1752.599998	-0.001
50	1712.399999	-0.001	1752.599997	-0.002
60	1712.399998	-0.001	1752.599997	-0.002
70	1712.399996	-0.002	1752.599996	-0.002
80	1712.399999	-0.001	1752.599997	-0.002
85	1712.399997	-0.002	1752.599998	-0.001

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	1710.700004	0.002	1754.299996	-0.002
10.2	1710.700003	0.002	1754.299999	-0.001
13.8	1710.700001	0.001	1754.299997	-0.002

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1710.700004	0.002	1754.300004	0.002
-30	1710.700004	0.002	1754.300002	0.001
-20	1710.700001	0.001	1754.300004	0.002
-10	1710.700004	0.002	1754.300003	0.002
0	1710.700003	0.002	1754.300003	0.002
10	1710.699998	-0.001	1754.300002	0.001
20	1710.699997	-0.002	1754.300001	0.001
30	1710.699996	-0.002	1754.300003	0.002
40	1710.699998	-0.001	1754.299997	-0.001
50	1710.699998	-0.001	1754.299999	-0.001
60	1710.699997	-0.002	1754.299999	-0.001
70	1710.699997	-0.002	1754.299998	-0.001
80	1710.699997	-0.002	1754.299999	-0.001
85	1710.699998	-0.001	1754.299999	-0.001

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	1711.500003	0.002	1753.499996	-0.002
10.2	1711.500004	0.002	1753.499998	-0.001
13.8	1711.500003	0.002	1753.499998	-0.001

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1711.500003	0.002	1753.500002	0.001
-30	1711.500003	0.002	1753.500002	0.001
-20	1711.500004	0.002	1753.500003	0.002
-10	1711.500002	0.001	1753.500003	0.002
0	1711.500004	0.002	1753.500004	0.002
10	1711.499996	-0.002	1753.500002	0.001
20	1711.499997	-0.002	1753.500002	0.001
30	1711.499999	-0.001	1753.500002	0.001
40	1711.499998	-0.001	1753.499998	-0.001
50	1711.499997	-0.002	1753.499996	-0.002
60	1711.499999	-0.001	1753.499997	-0.002
70	1711.499997	-0.002	1753.499999	-0.001
80	1711.499998	-0.001	1753.499997	-0.002
85	1711.499999	-0.001	1753.499998	-0.001

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	1712.500002	0.001	1752.499998	-0.001
10.2	1712.500003	0.002	1752.499999	-0.001
13.8	1712.500002	0.001	1752.499999	-0.001

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1712.500004	0.002	1752.500002	0.001
-30	1712.500001	0.001	1752.500001	0.001
-20	1712.500001	0.001	1752.500002	0.001
-10	1712.500003	0.002	1752.500002	0.001
0	1712.500002	0.001	1752.500004	0.002
10	1712.499998	-0.001	1752.500004	0.002
20	1712.499998	-0.001	1752.500002	0.001
30	1712.499997	-0.002	1752.500003	0.002
40	1712.499997	-0.002	1752.499996	-0.002
50	1712.499998	-0.001	1752.499996	-0.002
60	1712.499996	-0.002	1752.499998	-0.001
70	1712.499999	-0.001	1752.499998	-0.001
80	1712.499997	-0.002	1752.499996	-0.002
85	1712.499996	-0.002	1752.499996	-0.002

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	1715.000001	0.001	1749.999997	-0.002
10.2	1715.000002	0.001	1749.999997	-0.002
13.8	1715.000002	0.001	1749.999996	-0.002

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1715.000004	0.002	1750.000003	0.002
-30	1715.000002	0.001	1750.000002	0.001
-20	1715.000003	0.002	1750.000004	0.002
-10	1715.000004	0.002	1750.000002	0.001
0	1715.000002	0.001	1750.000003	0.002
10	1714.999997	-0.002	1750.000003	0.002
20	1714.999999	-0.001	1750.000004	0.002
30	1714.999997	-0.002	1750.000003	0.002
40	1714.999999	-0.001	1749.999998	-0.001
50	1714.999998	-0.001	1749.999998	-0.001
60	1714.999997	-0.002	1749.999996	-0.002
70	1714.999999	-0.001	1749.999996	-0.002
80	1714.999998	-0.001	1749.999998	-0.001
85	1714.999999	-0.001	1749.999996	-0.002

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	1717.500004	0.002	1747.499998	-0.001
10.2	1717.500003	0.002	1747.499998	-0.001
13.8	1717.500002	0.001	1747.499998	-0.001

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1717.500003	0.002	1747.500004	0.002
-30	1717.500002	0.001	1747.500002	0.001
-20	1717.500004	0.002	1747.500003	0.002
-10	1717.500002	0.001	1747.500002	0.001
0	1717.500001	0.001	1747.500003	0.002
10	1717.499999	-0.001	1747.500002	0.001
20	1717.499998	-0.001	1747.500004	0.002
30	1717.499997	-0.002	1747.500002	0.001
40	1717.499998	-0.001	1747.499998	-0.001
50	1717.499999	-0.001	1747.499998	-0.001
60	1717.499998	-0.001	1747.499999	-0.001
70	1717.499997	-0.002	1747.499998	-0.001
80	1717.499999	-0.001	1747.499998	-0.001
85	1717.499999	-0.001	1747.499996	-0.002

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	1720.000002	0.001	1744.999998	-0.001
10.2	1720.000002	0.001	1744.999997	-0.002
13.8	1720.000003	0.002	1744.999996	-0.002

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	1720.000004	0.002	1745.000002	0.001
-30	1720.000001	0.001	1745.000003	0.002
-20	1720.000003	0.002	1745.000002	0.001
-10	1720.000003	0.002	1745.000002	0.001
0	1720.000002	0.001	1745.000002	0.001
10	1719.999997	-0.002	1745.000001	0.001
20	1719.999999	-0.001	1745.000001	0.001
30	1719.999999	-0.001	1745.000002	0.001
40	1719.999998	-0.001	1744.999998	-0.001
50	1719.999999	-0.001	1744.999998	-0.001
60	1719.999997	-0.002	1744.999996	-0.002
70	1719.999998	-0.001	1744.999997	-0.002
80	1719.999998	-0.001	1744.999996	-0.002
85	1719.999997	-0.002	1744.999999	-0.001

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	699.700003	0.004	715.299996	-0.005
10.2	699.700003	0.004	715.299998	-0.002
13.8	699.700001	0.001	715.299997	-0.005

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	699.700003	0.004	715.300003	0.004
-30	699.700001	0.002	715.300001	0.001
-20	699.700002	0.002	715.300004	0.005
-10	699.700004	0.005	715.300004	0.005
0	699.700001	0.002	715.300002	0.003
10	699.699998	-0.003	715.300001	0.002
20	699.699996	-0.006	715.300003	0.004
30	699.699999	-0.002	715.300002	0.002
40	699.699999	-0.002	715.299997	-0.004
50	699.699999	-0.001	715.299999	-0.002
60	699.699997	-0.005	715.299998	-0.003
70	699.699999	-0.002	715.299998	-0.003
80	699.699997	-0.004	715.299997	-0.004
85	699.699998	-0.003	715.299999	-0.002

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	700.500001	0.002	714.499998	-0.003
10.2	700.500003	0.004	714.499998	-0.003
13.8	700.500001	0.002	714.499999	-0.002

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	700.500004	0.005	714.500003	0.004
-30	700.500003	0.004	714.500003	0.004
-20	700.500004	0.005	714.500002	0.003
-10	700.500003	0.004	714.500002	0.003
0	700.500004	0.005	714.500002	0.003
10	700.499997	-0.005	714.500002	0.003
20	700.499998	-0.003	714.500002	0.002
30	700.499997	-0.004	714.500001	0.002
40	700.499996	-0.005	714.499996	-0.005
50	700.499997	-0.004	714.499997	-0.004
60	700.499997	-0.004	714.499997	-0.004
70	700.499998	-0.003	714.499998	-0.002
80	700.499998	-0.003	714.499997	-0.004
85	700.499999	-0.002	714.499997	-0.005

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	701.500002	0.002	713.499998	-0.003
10.2	701.500002	0.002	713.499999	-0.002
13.8	701.500001	0.002	713.499998	-0.003

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	701.500004	0.006	713.500004	0.006
-30	701.500004	0.006	713.500003	0.004
-20	701.500003	0.005	713.500004	0.005
-10	701.500004	0.005	713.500002	0.002
0	701.500004	0.005	713.500002	0.003
10	701.499999	-0.002	713.500003	0.005
20	701.499997	-0.004	713.500001	0.002
30	701.499996	-0.005	713.500002	0.003
40	701.499999	-0.002	713.499997	-0.004
50	701.499998	-0.003	713.499997	-0.004
60	701.499997	-0.005	713.499999	-0.002
70	701.499998	-0.003	713.499997	-0.004
80	701.499998	-0.003	713.499998	-0.002
85	701.499997	-0.005	713.499997	-0.004

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 12			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
12	704.000001	0.002	710.999997	-0.004
10.2	704.000003	0.004	710.999997	-0.005
13.8	704.000003	0.004	710.999997	-0.005

Note: The applicant defined the normal working voltage is from 10.2 Vdc to 13.8 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	704.000002	0.003	711.000001	0.002
-30	704.000001	0.002	711.000001	0.002
-20	704.000002	0.002	711.000001	0.002
-10	704.000004	0.006	711.000003	0.005
0	704.000004	0.005	711.000001	0.002
10	703.999997	-0.005	711.000003	0.005
20	703.999999	-0.001	711.000003	0.005
30	703.999998	-0.003	711.000001	0.002
40	703.999997	-0.005	710.999997	-0.004
50	703.999998	-0.002	710.999997	-0.004
60	703.999996	-0.005	710.999997	-0.004
70	703.999998	-0.004	710.999997	-0.004
80	703.999997	-0.005	710.999998	-0.003
85	703.999999	-0.002	710.999998	-0.004

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -40˚C to 85˚C.
2. The EUT would shut down automatically as below -40˚C.

4.4 Occupied Bandwidth Measurement

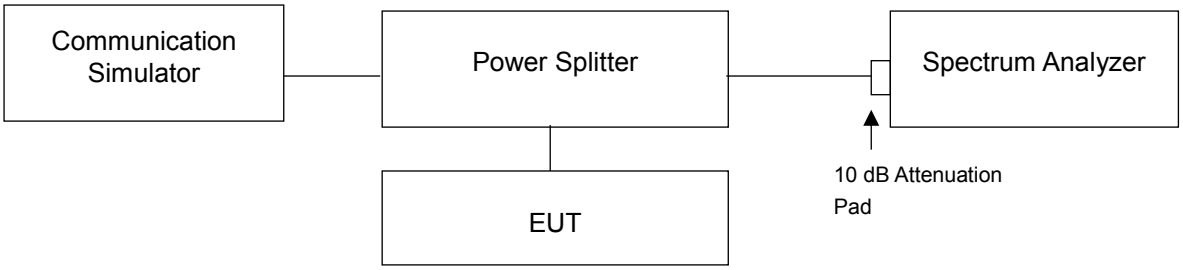
4.4.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.2 Test Procedure

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.3 Test Setup



4.4.4 Test Result

WCDMA			
Channel	**Frequency (MHz)**	**99 % Occupied Bandwidth (MHz)**	**26 dB Bandwidth (MHz)**
1312	1712.4	4.1513	4.753
1413	1732.6	4.1412	4.745
1513	1752.6	4.1605	4.774

Spectrum Plot of Worst Value

99 % Occupied Bandwidth

26 dB Bandwidth

LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19957	1710.7	1.0897	1.0895	1.260	1.275
20175	1732.5	1.0880	1.0903	1.269	1.259
20393	1754.3	1.0876	1.0894	1.272	1.275
Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19965	1711.5	2.7064	2.6976	2.925	2.916
20175	1732.5	2.7029	2.7001	2.913	2.914
20385	1753.5	2.7016	2.7027	2.925	2.922

Spectrum Plot of Worst Value

99 % Occupied Bandwidth	26 dB Bandwidth
1.4 MHz / 16QAM	1.4 MHz / 16QAM

3 MHz / QPSK	3 MHz / QPSK

LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19975	1712.5	4.4944	4.4949	4.848	4.823
20175	1732.5	4.4886	4.4917	4.820	4.866
20375	1752.5	4.4956	4.4948	4.864	4.861
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20000	1715.0	8.9558	8.9570	9.531	9.516
20175	1732.5	8.9591	8.9591	9.517	9.549
20350	1750.0	8.9551	8.9595	9.561	9.517

Spectrum Plot of Worst Value

99 % Occupied Bandwidth	26 dB Bandwidth
5 MHz / QPSK	**5 MHz / 16QAM**

10 MHz / 16QAM	10 MHz / QPSK

LTE Band 4					
Channel Bandwidth: 15 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20025	1717.5	13.436	13.442	14.22	14.23
20175	1732.5	13.412	13.408	14.22	14.22
20325	1747.5	13.436	13.434	14.25	14.24
Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20050	1720.0	17.913	17.911	19.03	19.00
20175	1732.5	17.874	17.874	18.98	18.98
20300	1745.0	17.932	17.916	19.02	19.00

Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	26 dB Bandwidth
15 MHz / 16QAM	15 MHz / QPSK
20 MHz / QPSK	20 MHz / QPSK

LTE Band 12					
Channel Bandwidth: 1.4 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23017	699.7	1.0878	1.0982	1.247	1.170
23095	707.5	1.0909	1.0897	1.248	1.259
23173	715.3	1.0903	1.0914	1.255	1.271
Channel Bandwidth: 3 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23025	700.5	2.7001	2.7003	2.981	2.929
23095	707.5	2.6997	2.7022	2.908	2.919
23165	714.5	2.7059	2.7060	2.921	2.924

Spectrum Plot of Worst Value

99 % Occupied Bandwidth	26 dB Bandwidth
1.4 MHz / 16QAM	1.4 MHz / 16QAM

3 MHz / 16QAM	3 MHz / QPSK

LTE Band 12					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23035	701.5	4.4943	4.4929	4.835	4.821
23095	707.5	4.4903	4.4914	4.801	4.858
23155	713.5	4.5007	4.5029	4.850	4.822
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23060	704.0	8.9932	8.9926	9.572	9.588
23095	707.5	8.9429	8.9377	9.505	9.493
23130	711.0	8.9293	8.9252	9.470	9.502

Spectrum Plot of Worst Value	
99 % Occupied Bandwidth	26 dB Bandwidth
5 MHz / 16QAM	5 MHz / 16QAM
10 MHz / QPSK	10 MHz / 16QAM

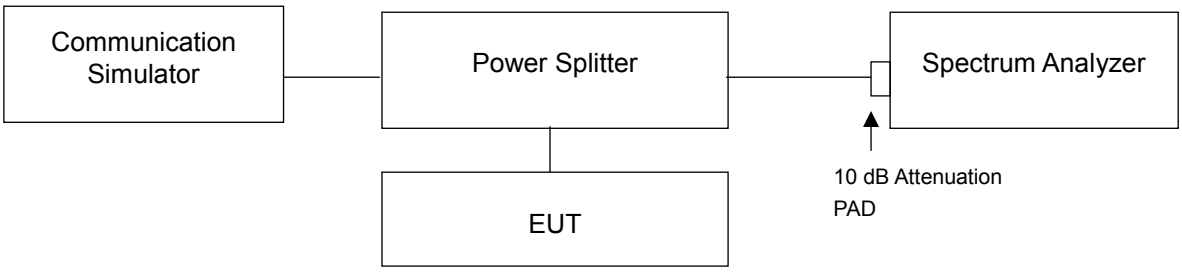
4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

For operations in the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.
However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For operations in the 1710–1755 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB.

4.5.2 Test Setup



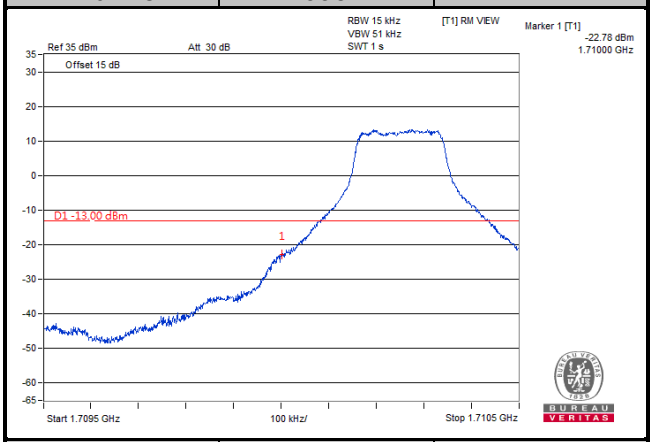
4.5.3 Test Procedures

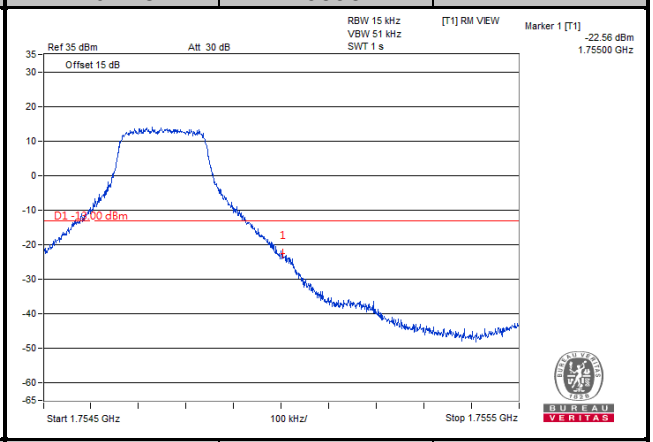
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 160 kHz (WCDMA).
c. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz or 30 kHz and VB of the spectrum is 51 kHz or 100 kHz (LTE Bandwidth 1.4 MHz).
d. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
e. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 62 kHz and VB of the spectrum is 200 kHz (LTE Bandwidth 5 MHz).
f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
g. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
h. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 20 MHz).
i. Record the max. trace plot into the test report.

4.5.4 Test Results

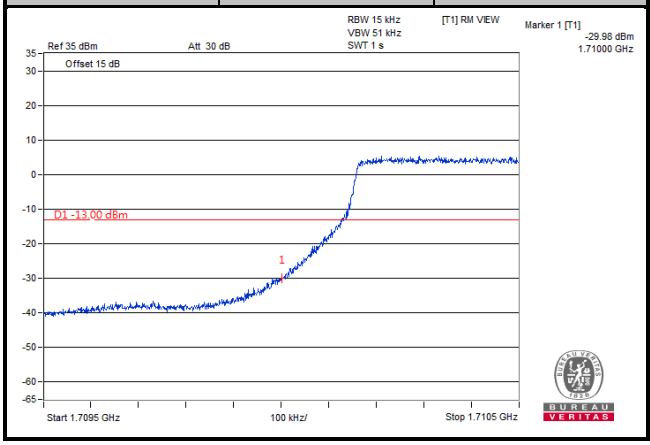
WCDMA			
Channel	1312	Channel	1513

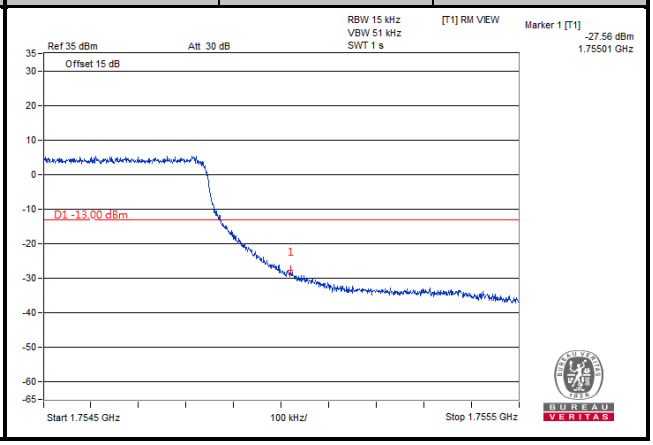
LTE Band 4					
Channel Bandwidth: 1.4 MHz					
Channel	19957	1 RB	Channel	20393	1 RB

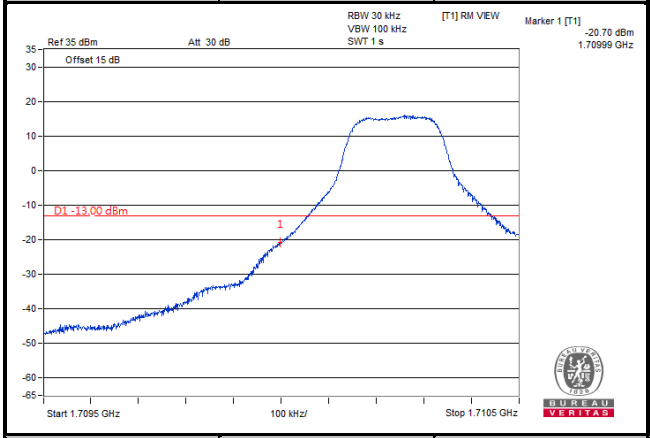
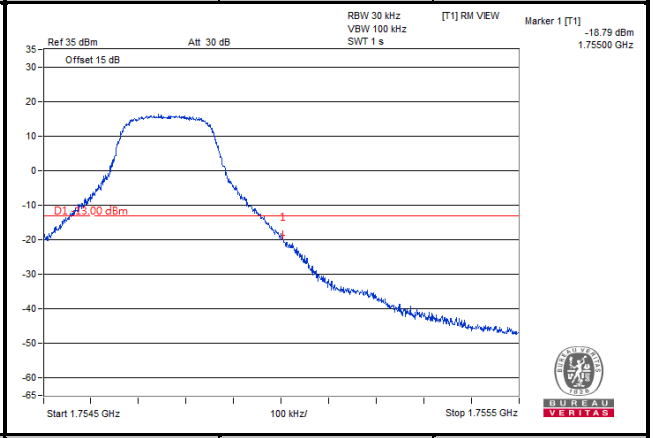
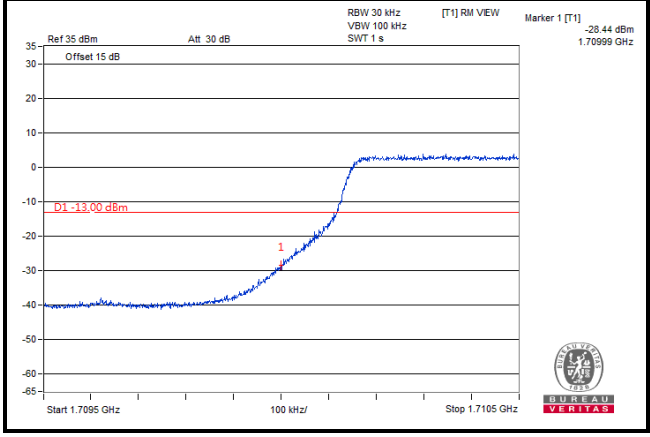
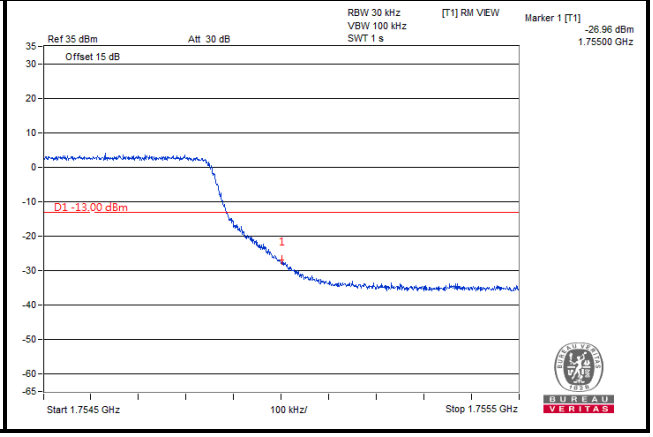


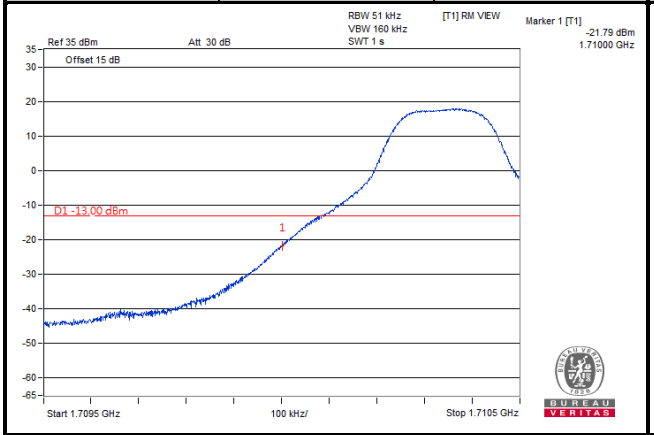
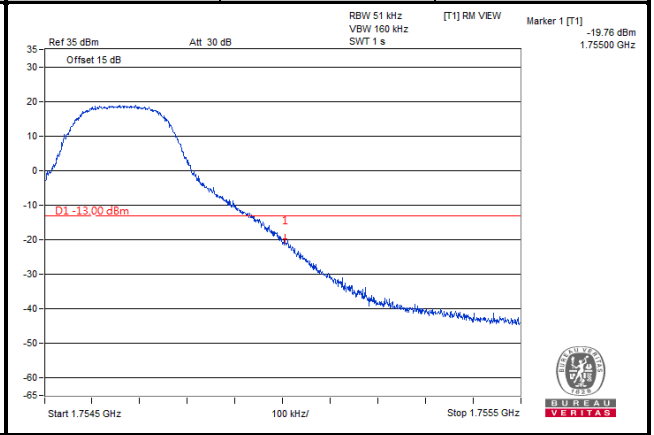
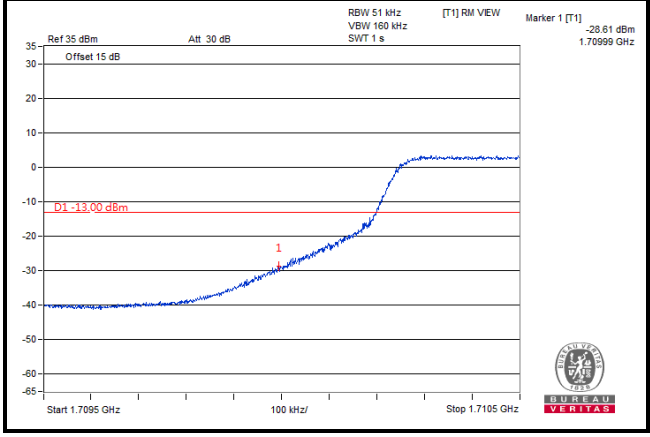
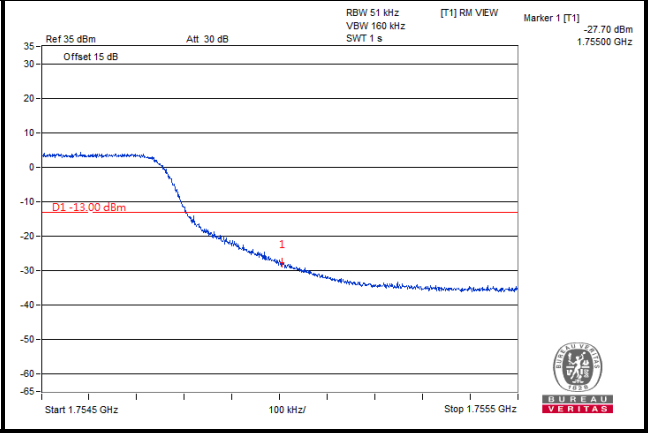


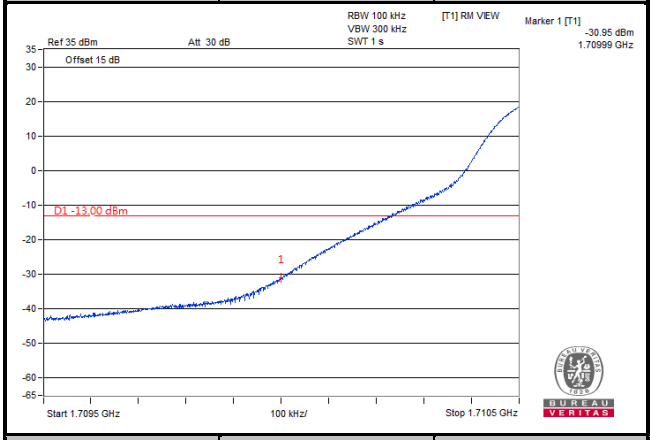
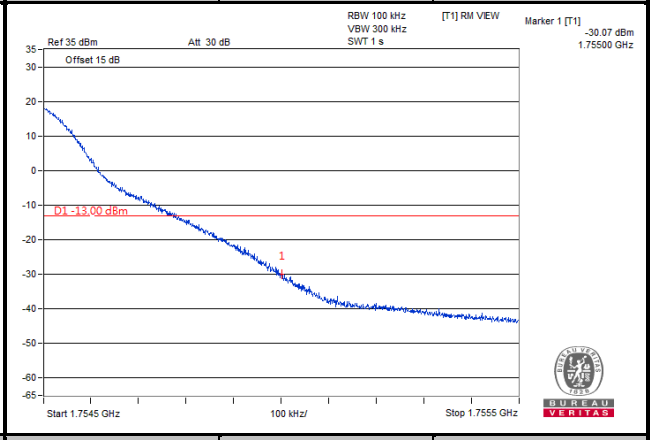
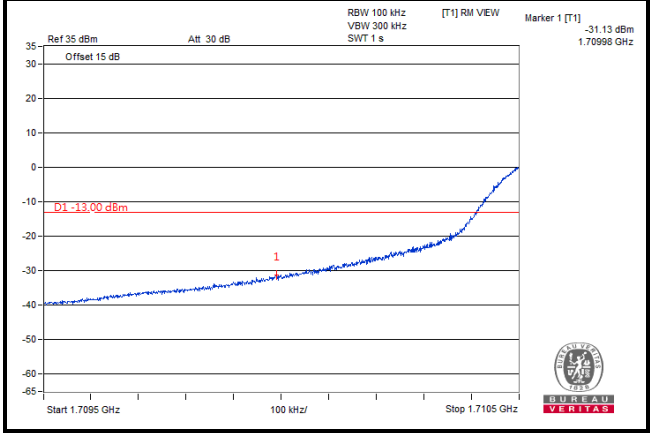
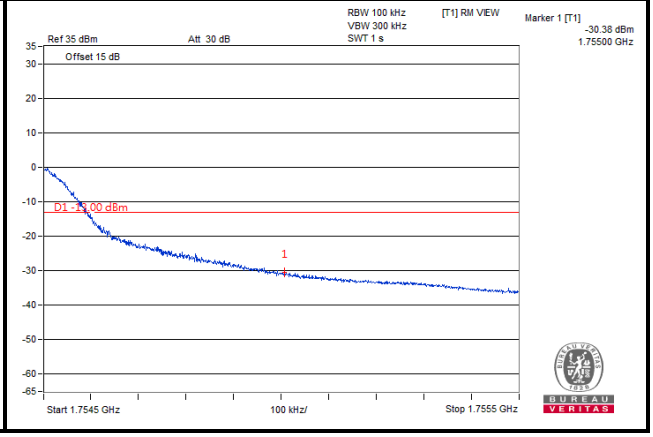
Channel	19957	6 RB	Channel	20393	6 RB

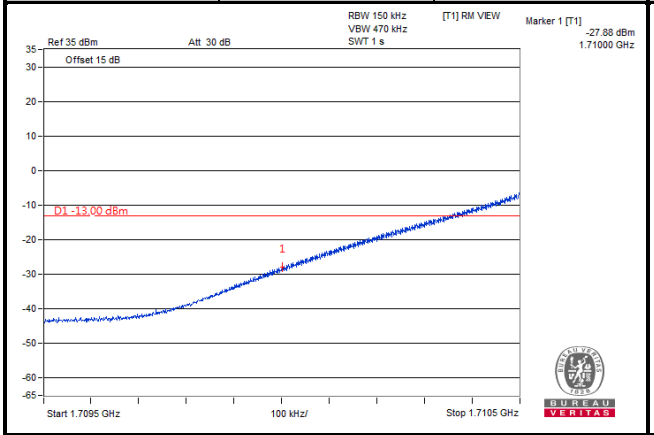
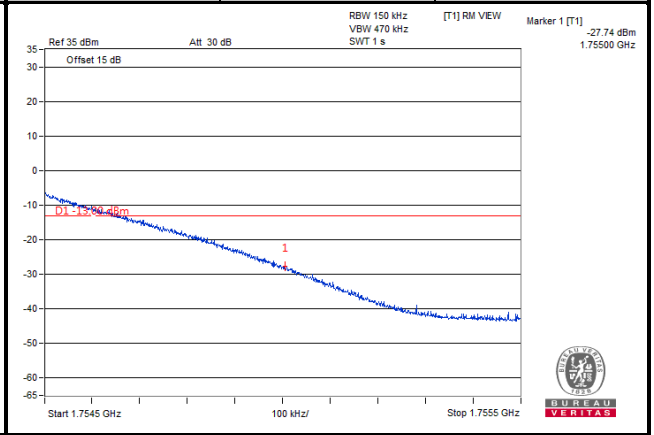
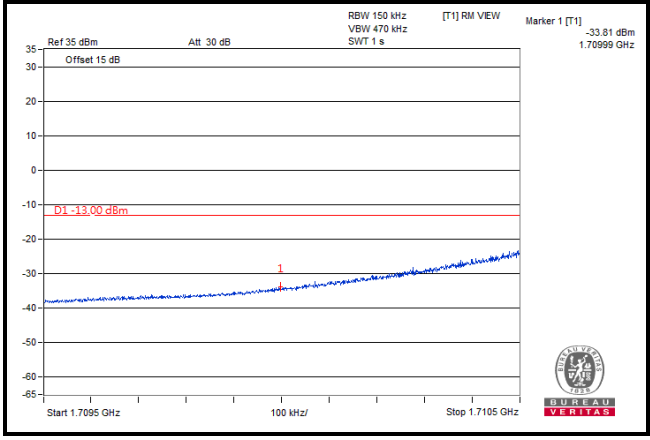
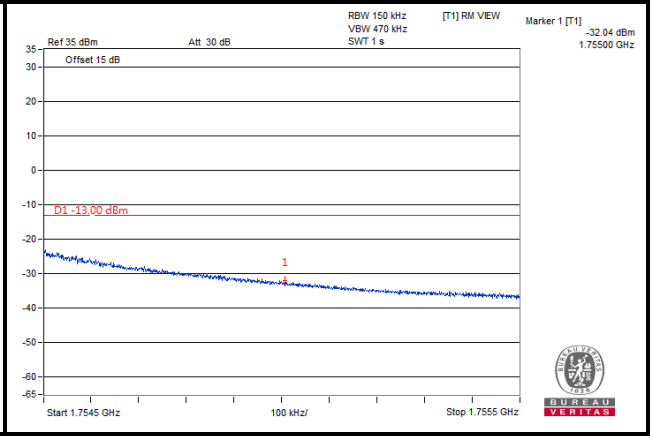


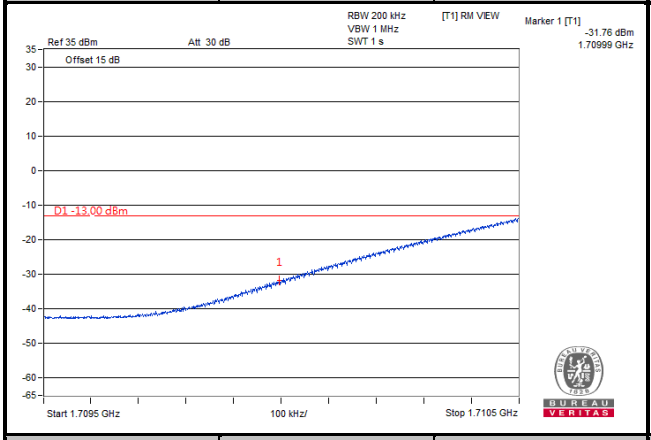
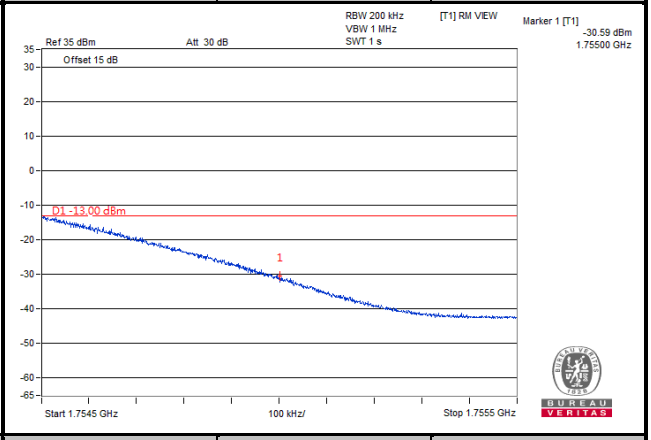
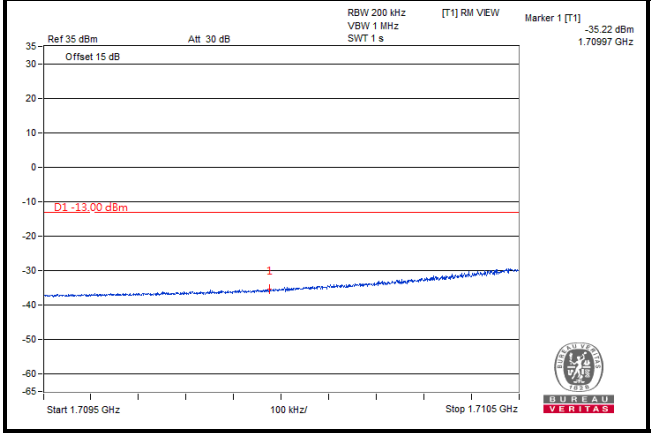
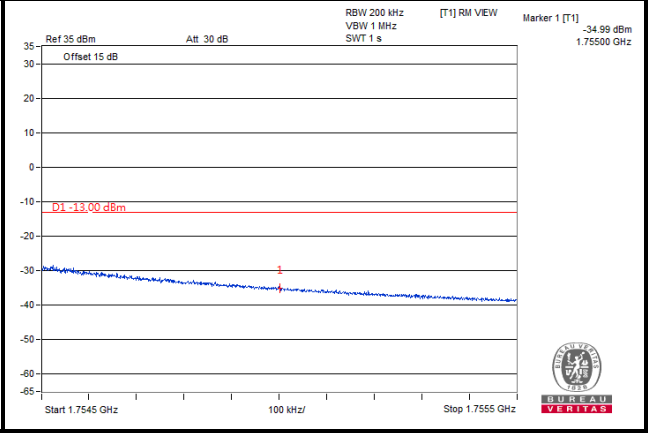


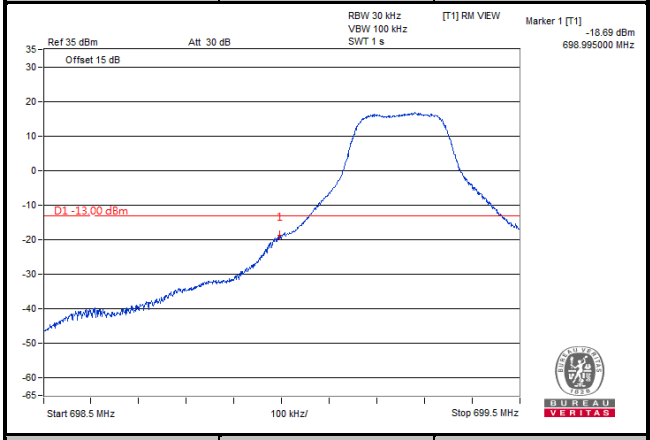
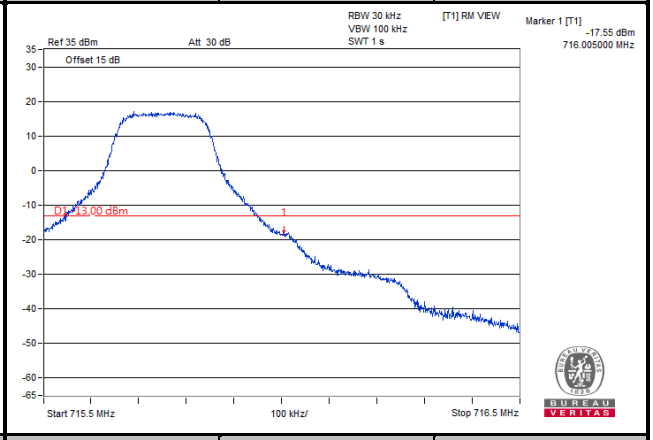
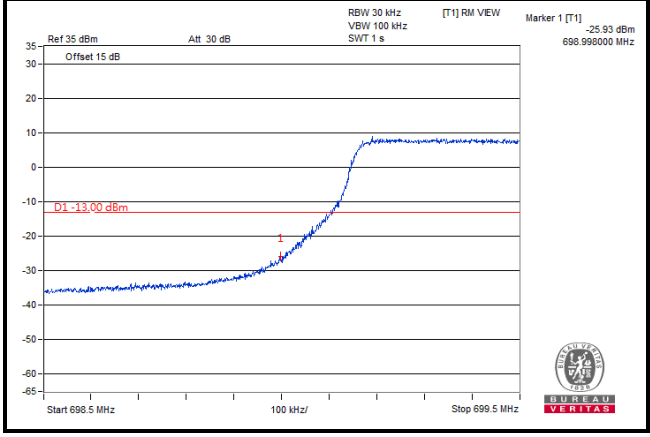
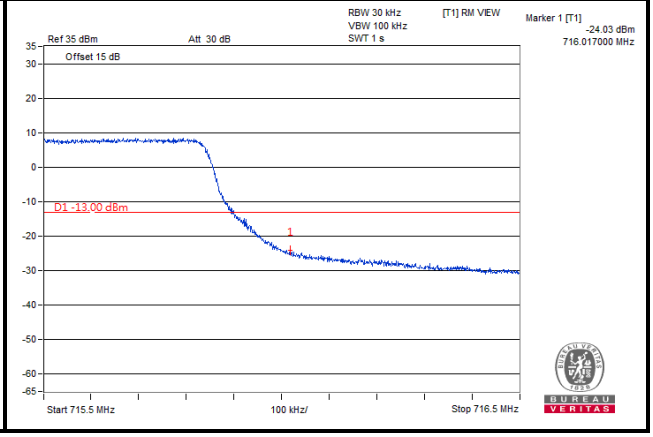
LTE Band 4					
Channel Bandwidth: 3 MHz					
Channel	19965	1 RB	Channel	20385	1 RB
					
Channel	19965	15 RB	Channel	20385	15 RB
					

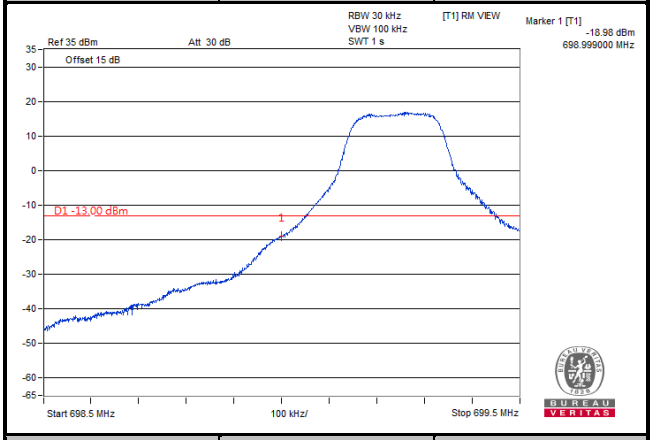
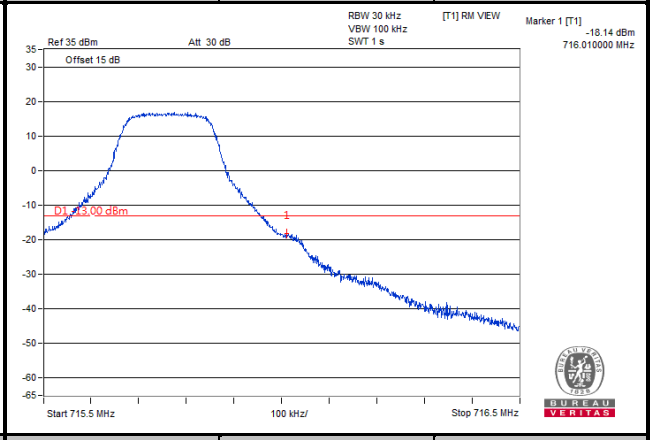
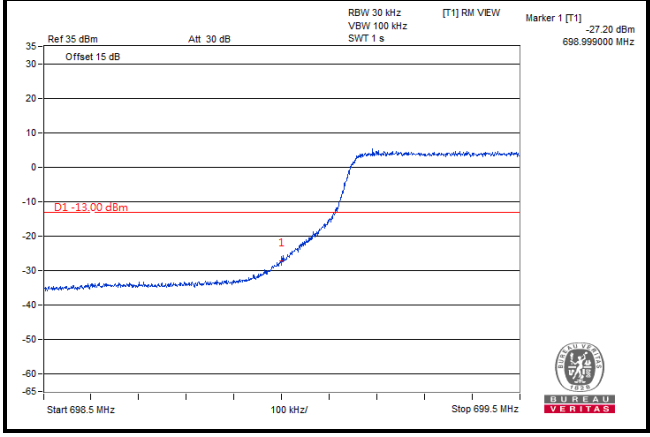
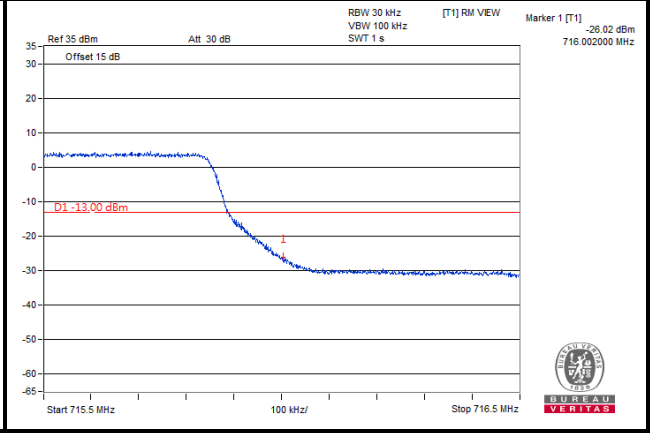
LTE Band 4					
Channel Bandwidth: 5 MHz					
Channel	19975	1 RB	Channel	20375	1 RB
					
Channel	19975	25 RB	Channel	20375	25 RB
					

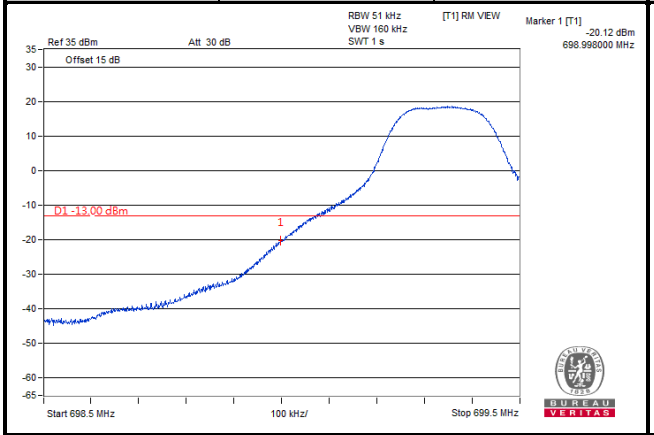
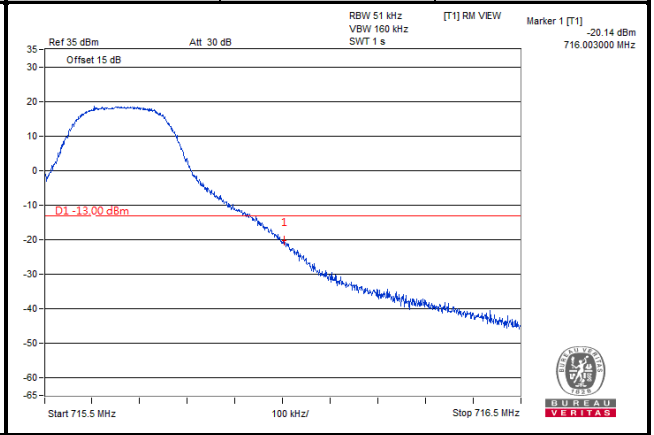
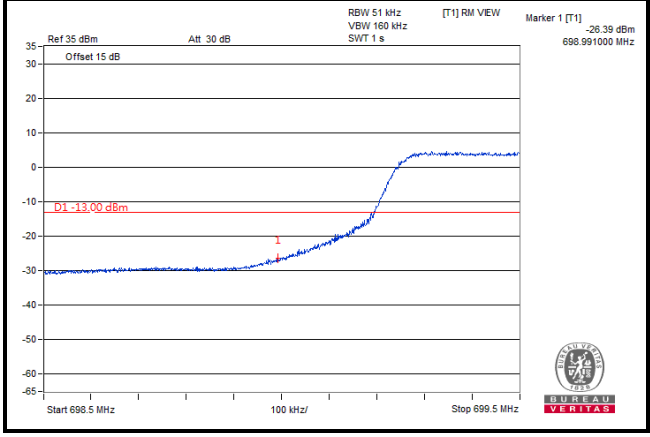
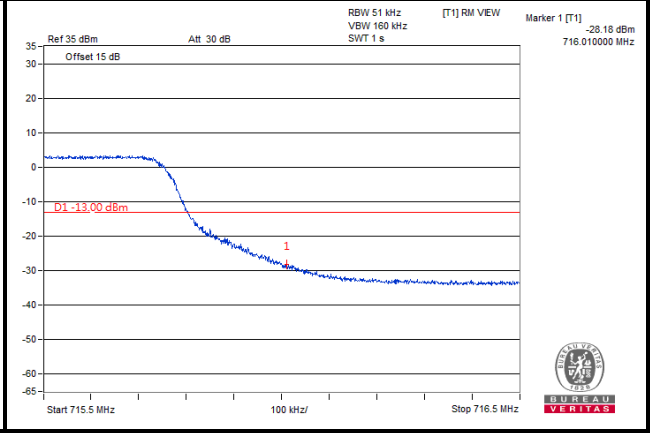
LTE Band 4					
Channel Bandwidth: 10 MHz					
Channel	20000	1 RB	Channel	20350	1 RB
					
Channel	20000	50 RB	Channel	20350	50 RB
					

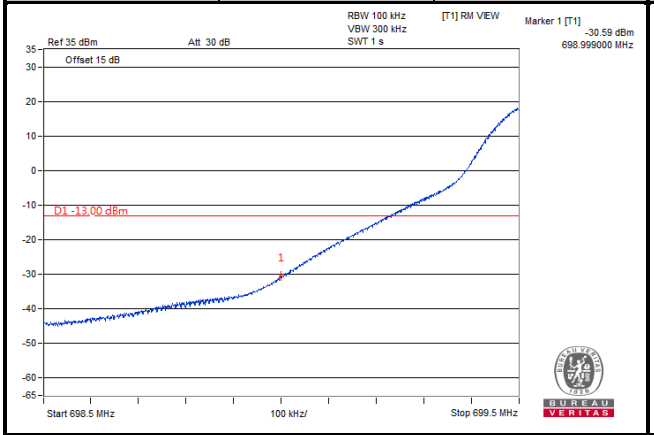
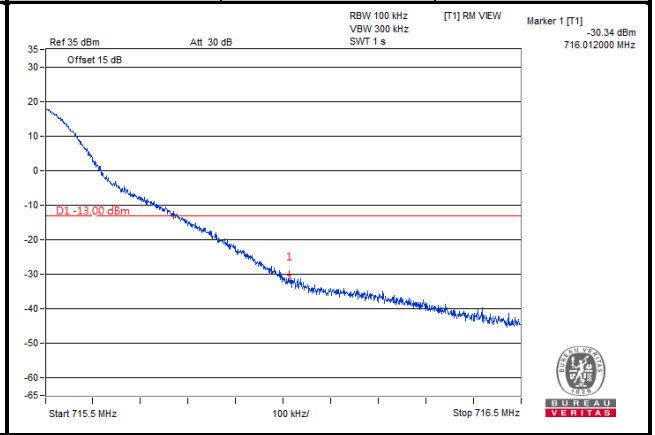
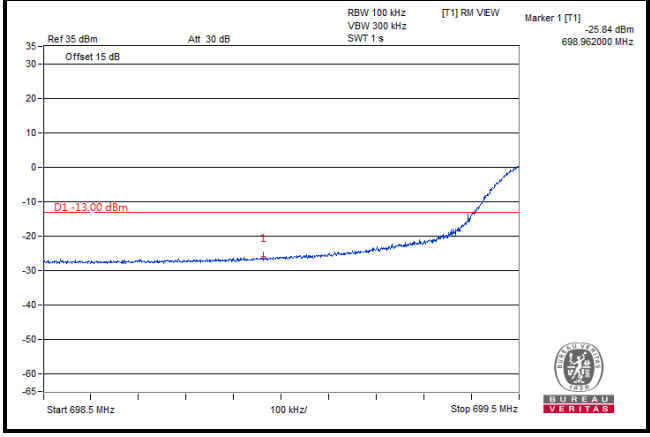
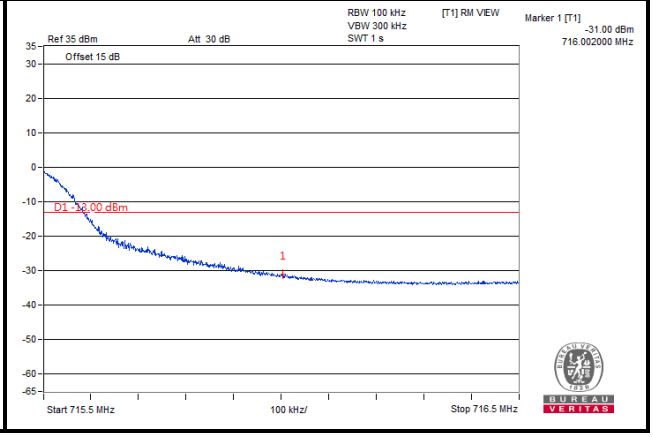
LTE Band 4					
Channel Bandwidth: 15 MHz					
Channel	20025	1 RB	Channel	20325	1 RB
					
Channel	20025	75 RB	Channel	20325	75 RB
					

LTE Band 4					
Channel Bandwidth: 20 MHz					
Channel	20050	1 RB	Channel	20300	1 RB
					
Channel	20050	100 RB	Channel	20300	100 RB
					

LTE Band 12					
Channel Bandwidth: 1.4 MHz					
Channel	23017	1 RB	Channel	23173	1 RB
					
Channel	23017	6 RB	Channel	23173	6 RB
					

LTE Band 12					
Channel Bandwidth: 3 MHz					
Channel	23025	1 RB	Channel	23165	1 RB
					
Channel	23025	15 RB	Channel	23165	15 RB
					

LTE Band 12					
Channel Bandwidth: 5 MHz					
Channel	23035	1 RB	Channel	23155	1 RB
					
Channel	23035	25 RB	Channel	23155	25 RB
					

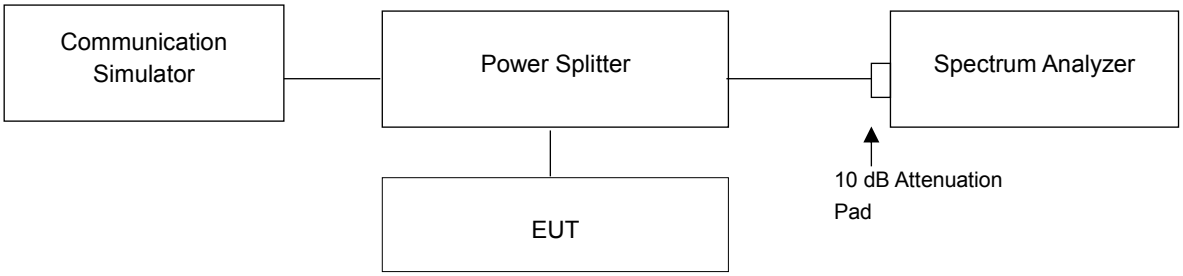
LTE Band 12					
Channel Bandwidth: 10 MHz					
Channel	23060	1 RB	Channel	23130	1 RB
					
Channel	23060	50 RB	Channel	23130	50 RB
					

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.6.2 Test Setup



4.6.3 Test Procedures

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.6.4 Test Results

WCDMA		
Channel	**Frequency (MHz)**	**Peak to Average Ratio (dB)**
1312	1712.4	2.69
1413	1732.6	2.84
1513	1752.6	2.62

Spectrum Plot of Worst Value

LTE Band 4							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19957	1710.7	3.94	4.91	19965	1711.5	4.00	4.91
20175	1732.5	4.38	5.20	20175	1732.5	4.44	5.35
20393	1754.3	3.69	4.68	20385	1753.5	3.93	4.86

Spectrum Plot of Worst Value	
1.4 MHz / 16QAM	3 MHz / 16QAM

LTE Band 4							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
19975	1712.5	4.00	4.92	20000	1715.0	3.87	4.73
20175	1732.5	4.44	5.35	20175	1732.5	5.16	5.30
20375	1752.5	4.02	4.83	20350	1750.0	3.87	4.83

Spectrum Plot of Worst Value	
5 MHz / 16QAM	10 MHz / 16QAM

LTE Band 4							
Channel Bandwidth: 15 MHz				Channel Bandwidth: 20 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
20025	1717.5	3.85	4.84	20050	1720.0	3.91	4.94
20175	1732.5	4.36	5.27	20175	1732.5	4.23	5.21
20325	1747.5	3.96	4.95	20300	1745.0	4.18	5.11

Spectrum Plot of Worst Value	
15 MHz / 16QAM	20 MHz / 16QAM

LTE Band 12							
Channel Bandwidth: 1.4 MHz				Channel Bandwidth: 3 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23017	699.7	4.01	4.96	23025	700.5	3.98	4.88
23095	707.5	4.73	5.62	23095	707.5	4.81	5.70
23173	715.3	4.24	5.26	23165	714.5	4.04	4.98

Spectrum Plot of Worst Value	
1.4 MHz / 16QAM	3 MHz / 16QAM

LTE Band 12							
Channel Bandwidth: 5 MHz				Channel Bandwidth: 10 MHz			
Channel	Frequency (MHz)	Peak to Average Ratio (dB)		Channel	Frequency (MHz)	Peak to Average Ratio (dB)	
		QPSK	16QAM			QPSK	16QAM
23035	701.5	3.93	4.85	23060	704.0	4.00	4.98
23095	707.5	4.75	5.68	23095	707.5	4.49	5.50
23155	713.5	3.79	4.78	23130	711.0	4.68	5.64

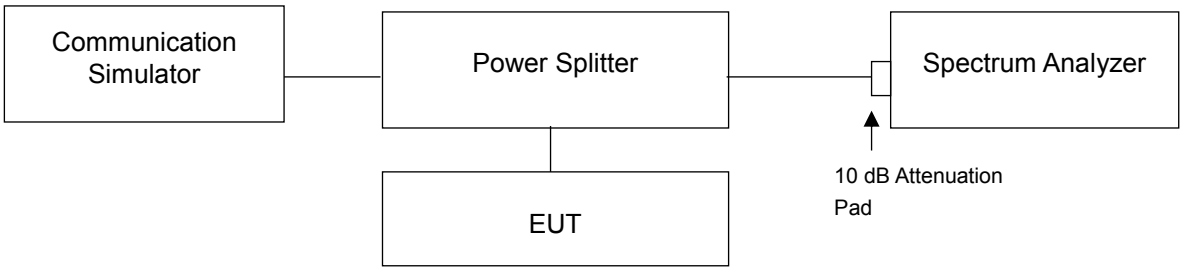
Spectrum Plot of Worst Value	
5 MHz / 16QAM	10 MHz / 16QAM

4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The limit of emission is equal to -13 dBm.

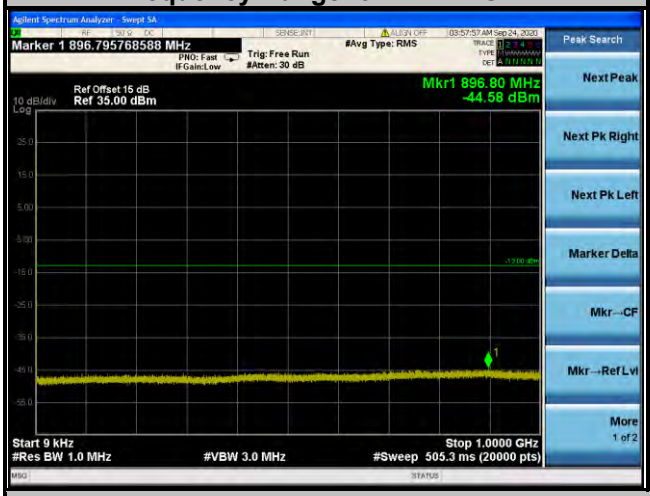
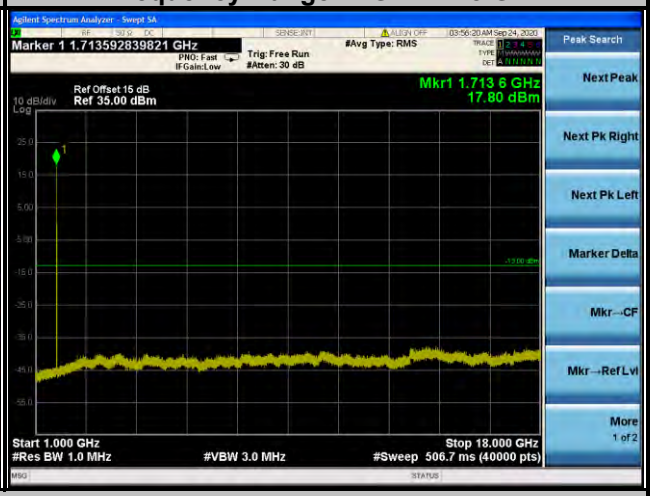
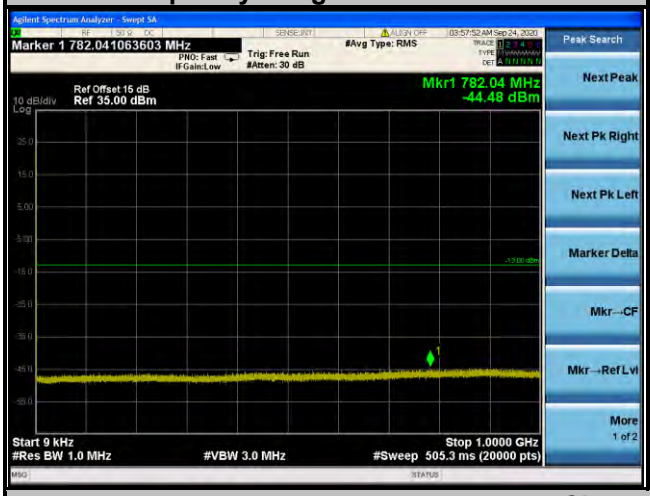
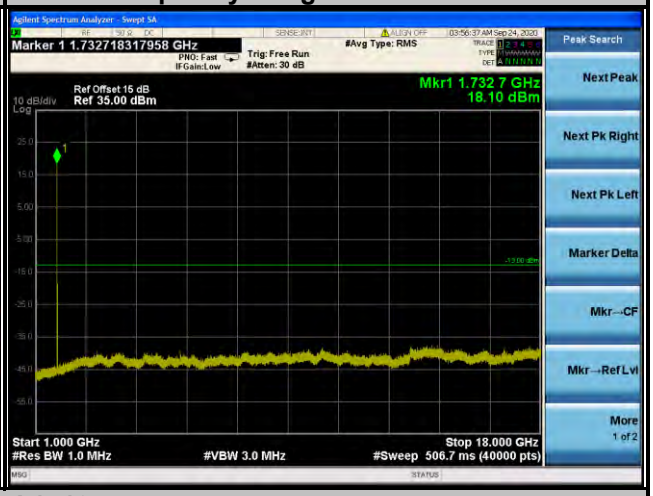
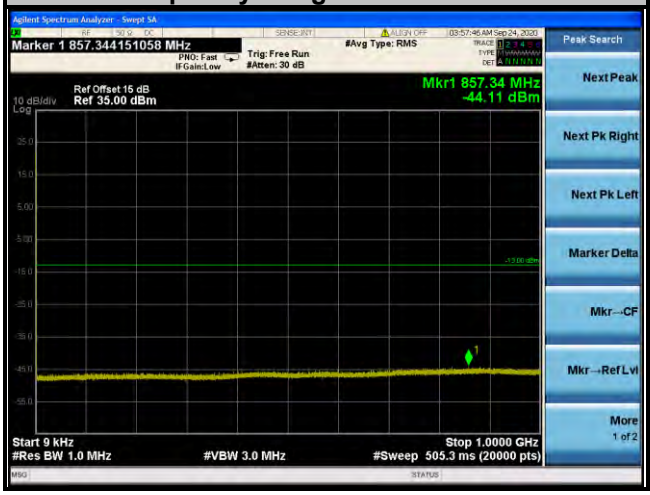
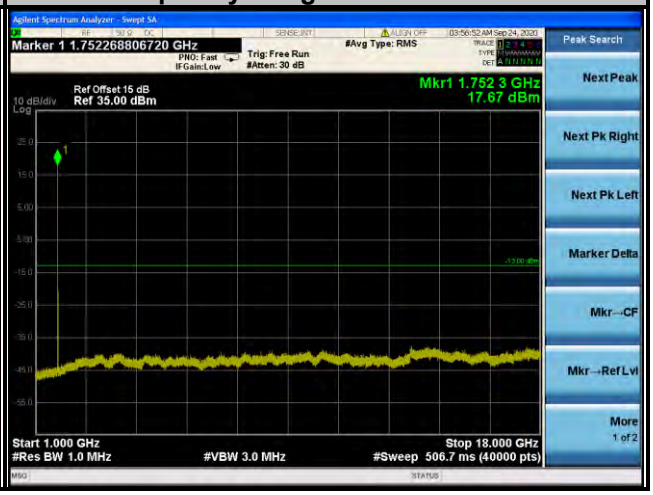
4.7.2 Test Setup



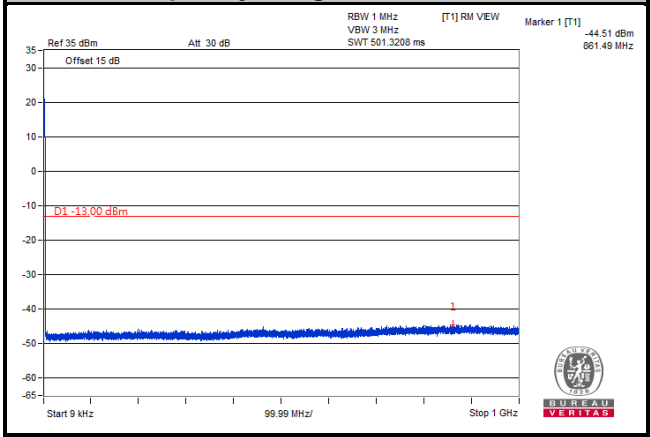
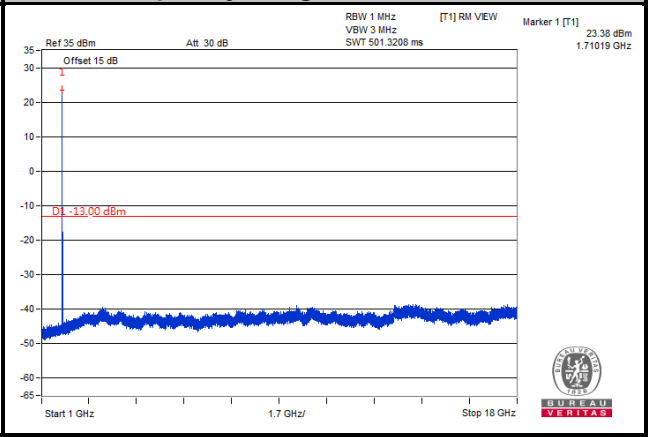
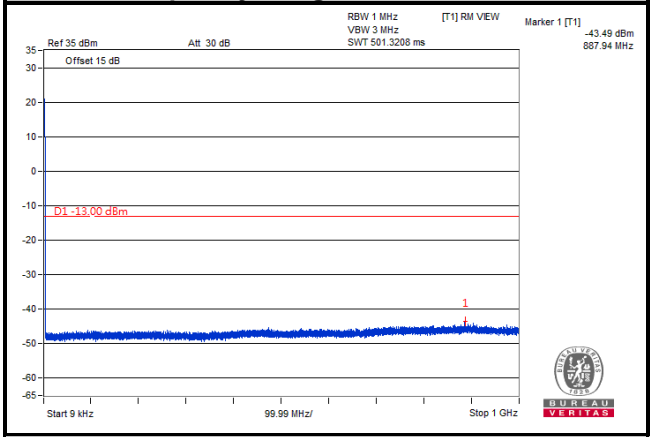
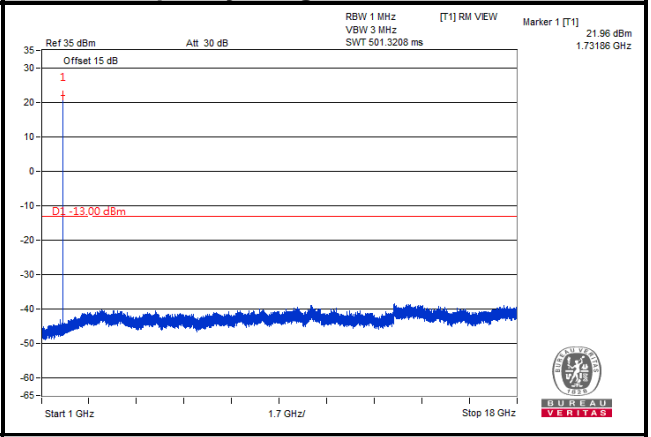
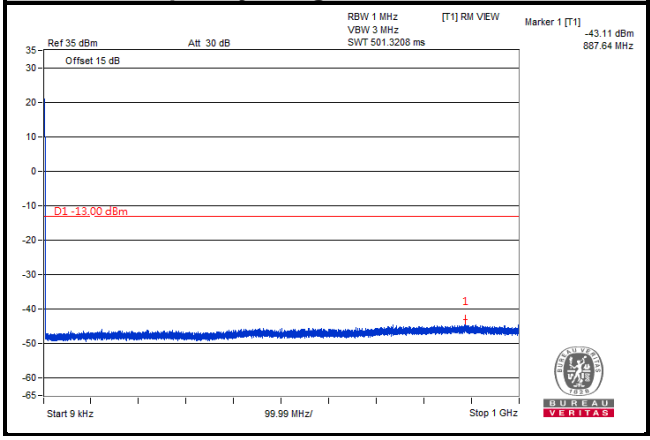
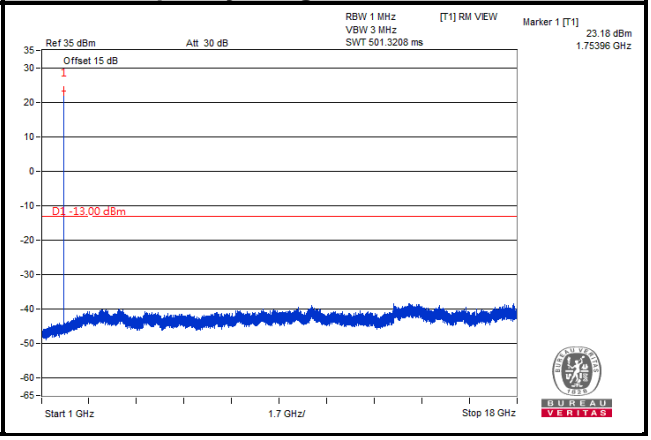
4.7.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement. (WCDMA/LTE Band 4)
c. Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 100 kHz and VBW = 300 kHz is used for conducted emission measurement. (LTE Band 12)
d. Measuring frequency range is from 1 GHz to 8 GHz / 18 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.

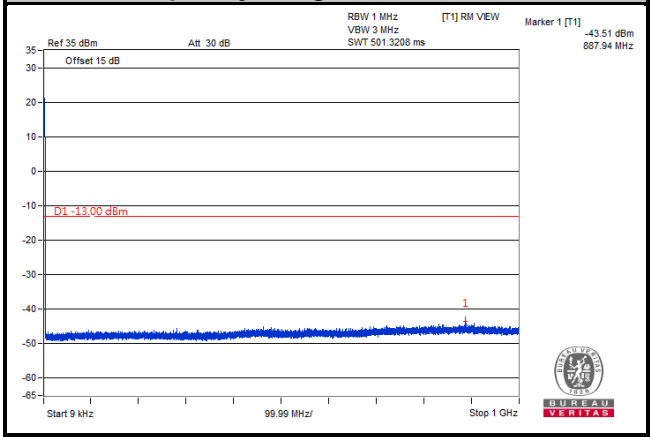
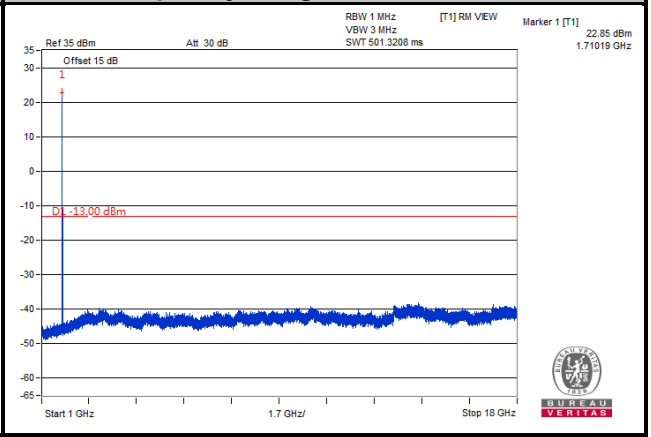
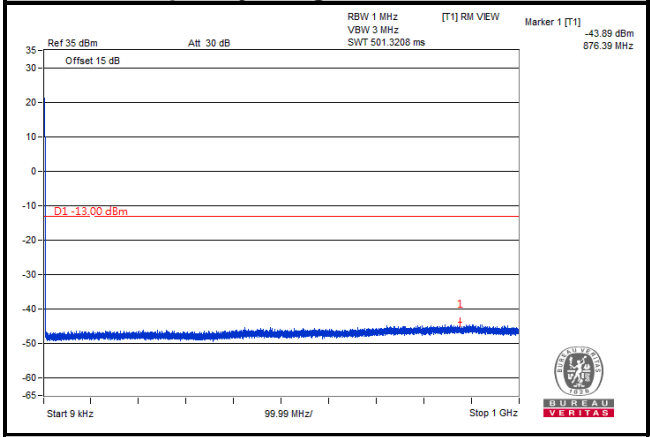
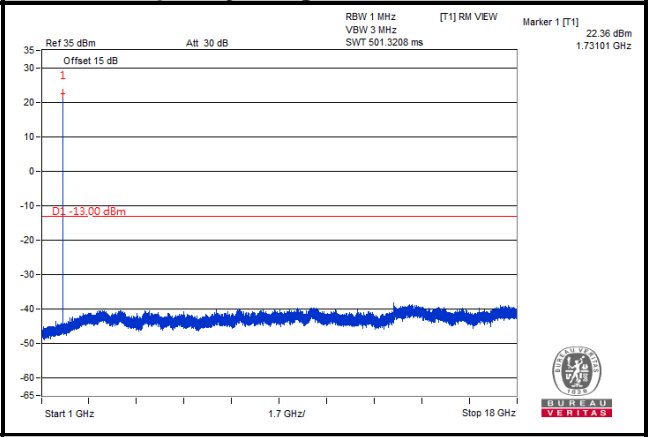
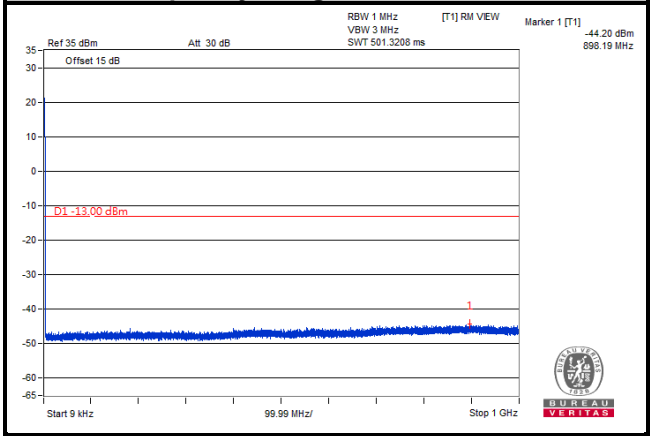
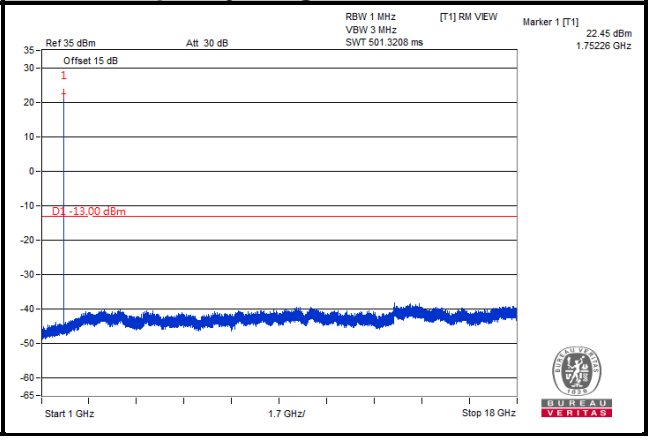
4.7.4 Test Results

WCDMA	
Channel 1312	
Frequency Range: 9 kHz ~ 1 GHz	**Frequency Range: 1 GHz ~ 18 GHz**
	
Channel 1413	
Frequency Range: 9 kHz ~ 1 GHz	**Frequency Range: 1 GHz ~ 18 GHz**
	
Channel 1513	
Frequency Range: 9 kHz ~ 1 GHz	**Frequency Range: 1 GHz ~ 18 GHz**
	

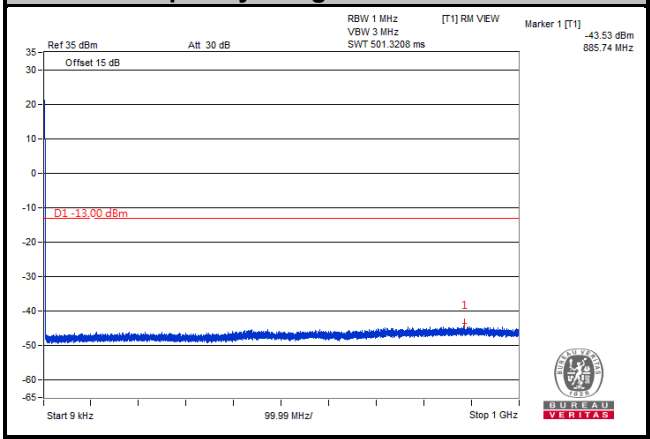
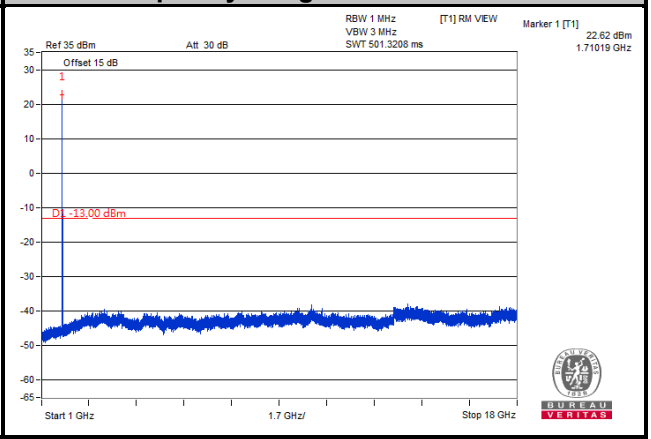
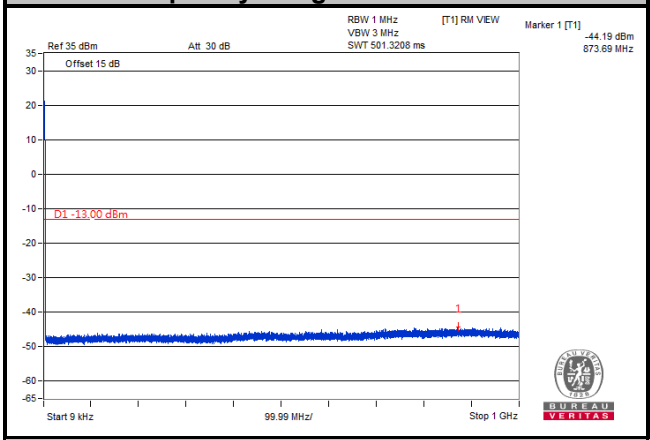
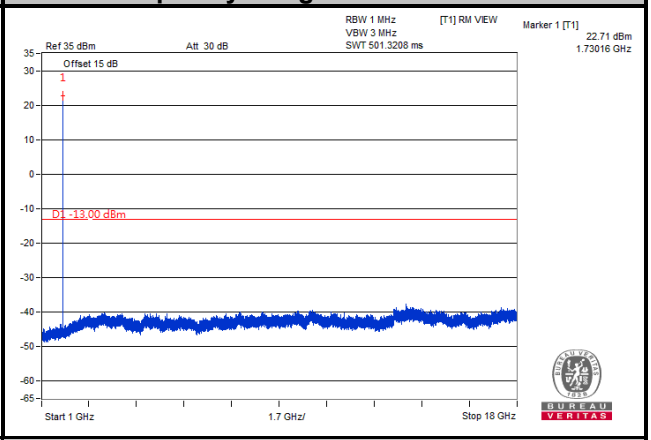
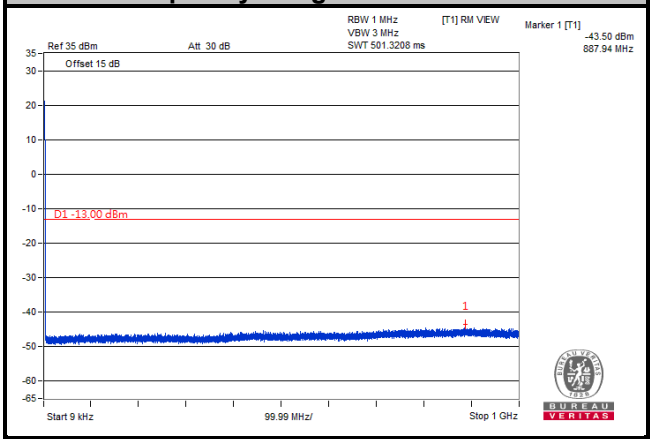
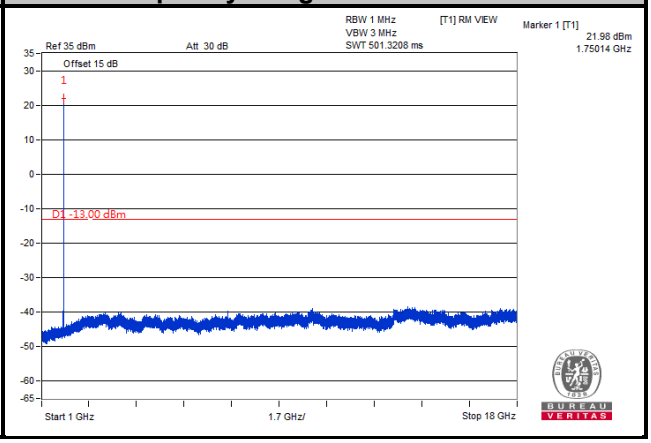
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 4	
Channel Bandwidth: 1.4 MHz	
Channel 19957	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20175	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20393	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	

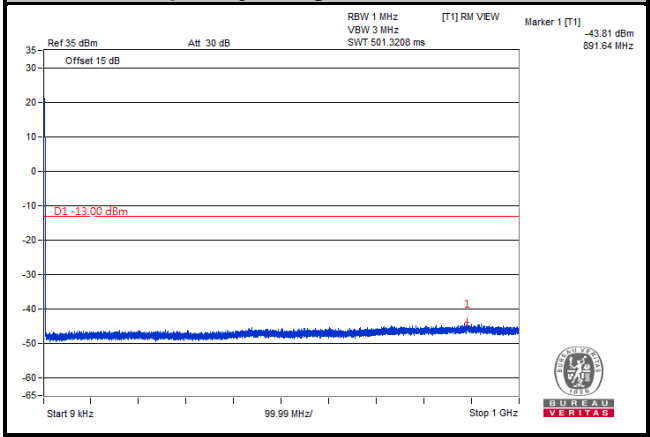
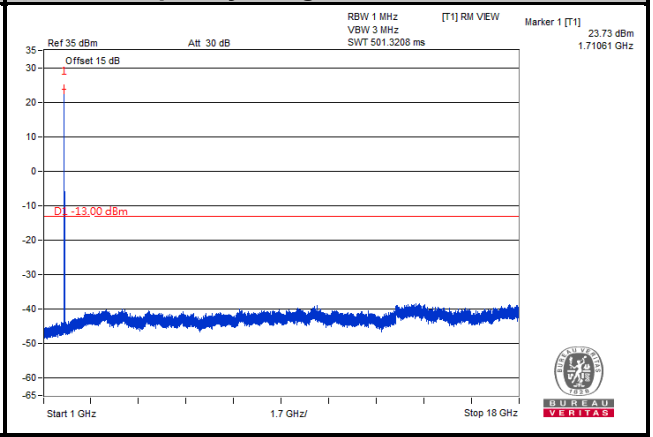
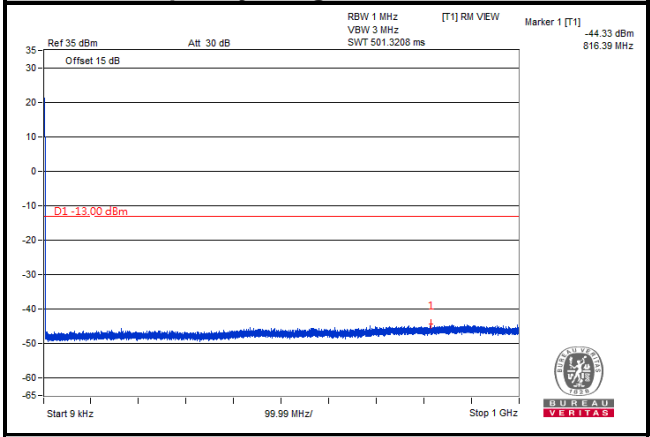
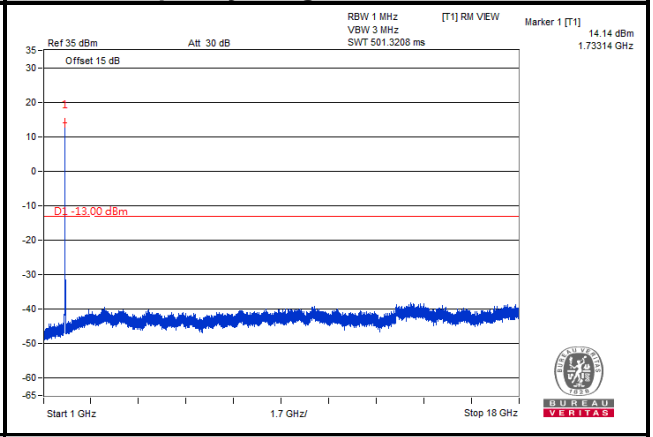
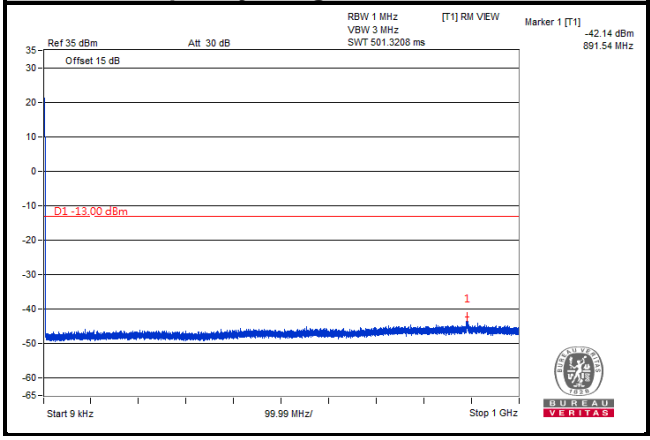
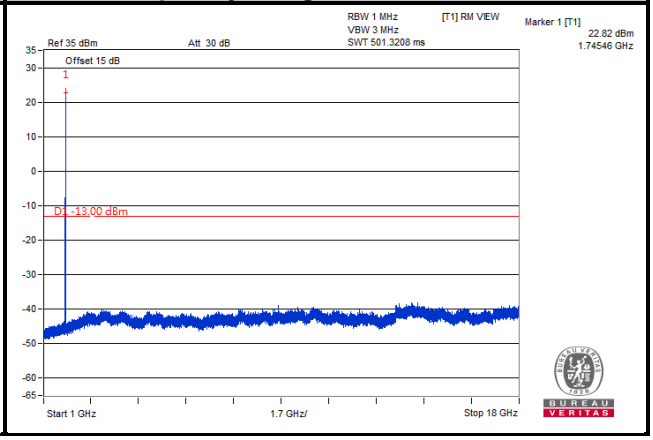
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 4	
Channel Bandwidth: 3 MHz	
Channel 19965	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20175	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20385	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	

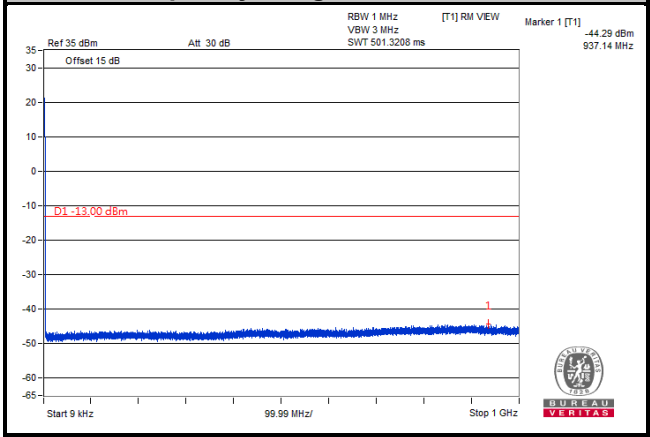
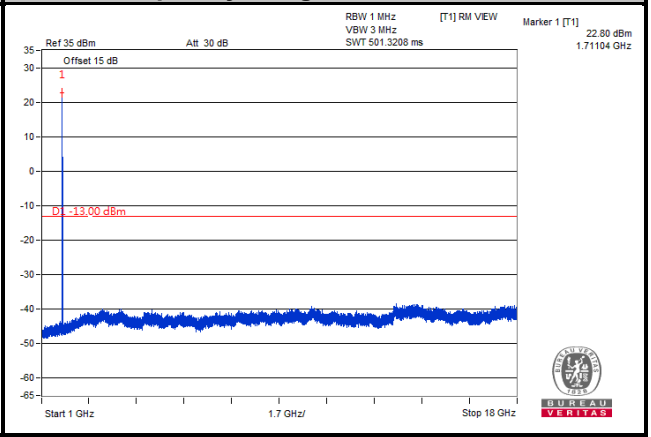
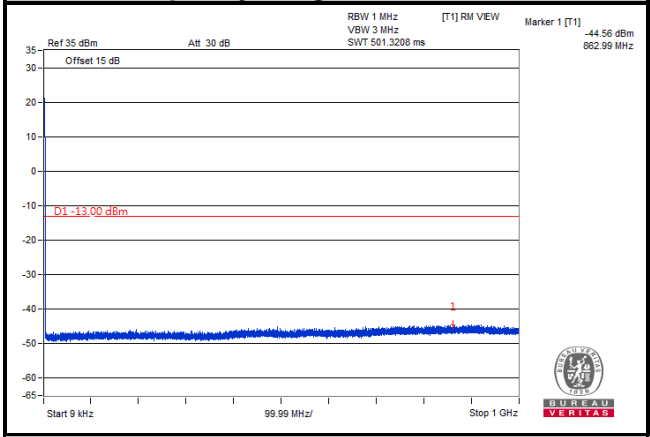
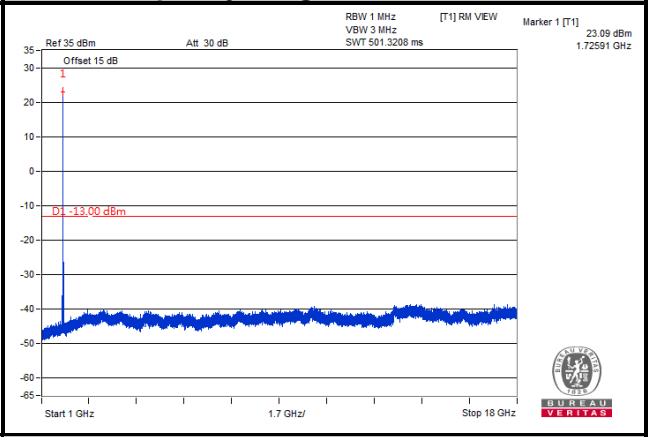
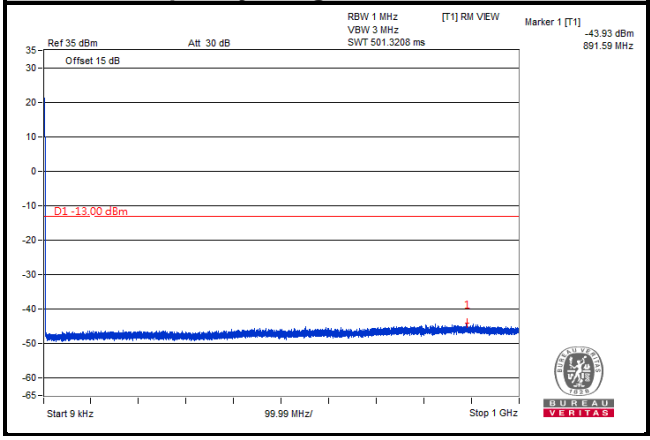
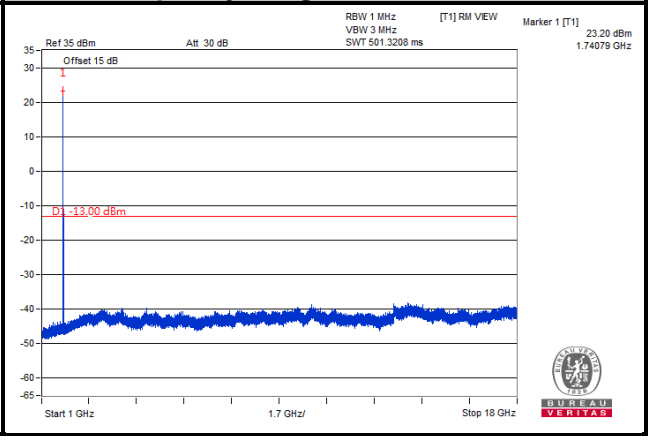
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 4	
Channel Bandwidth: 5 MHz	
Channel 19975	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20175	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20375	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	

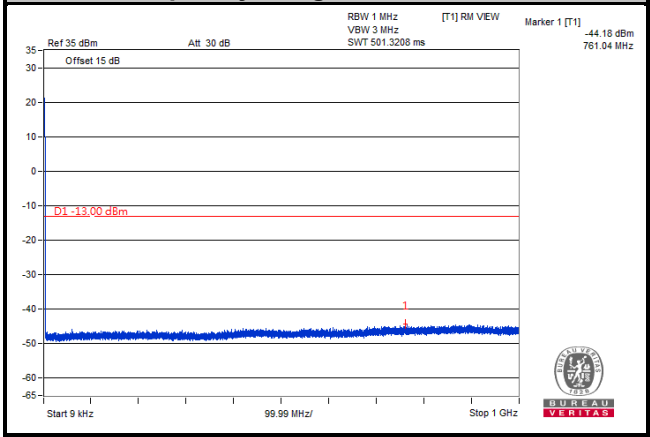
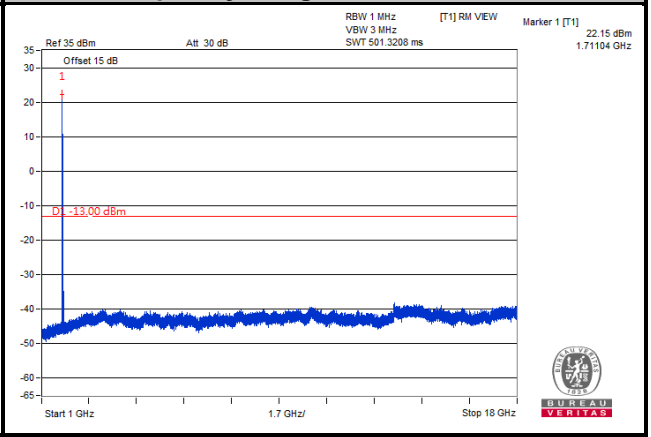
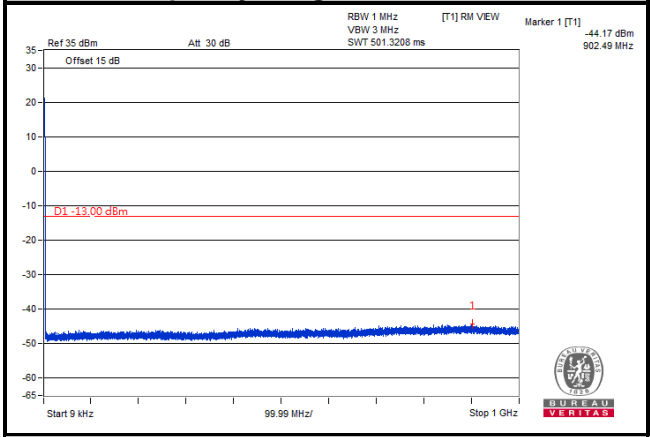
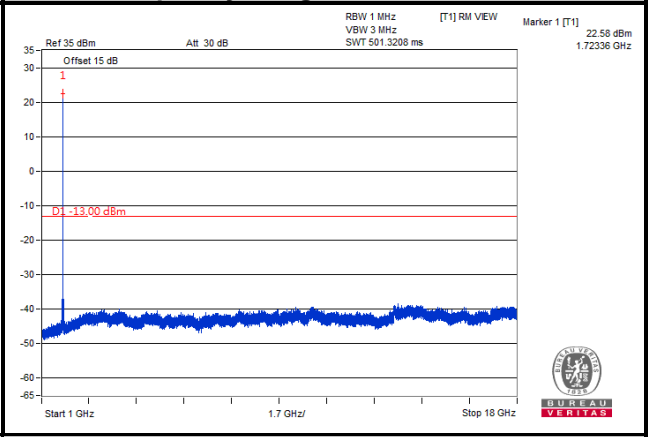
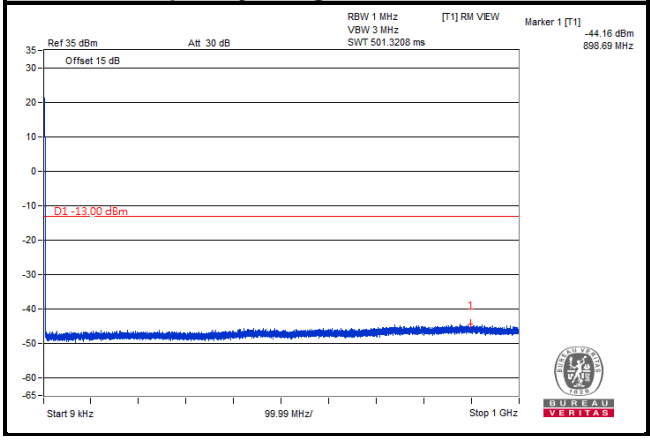
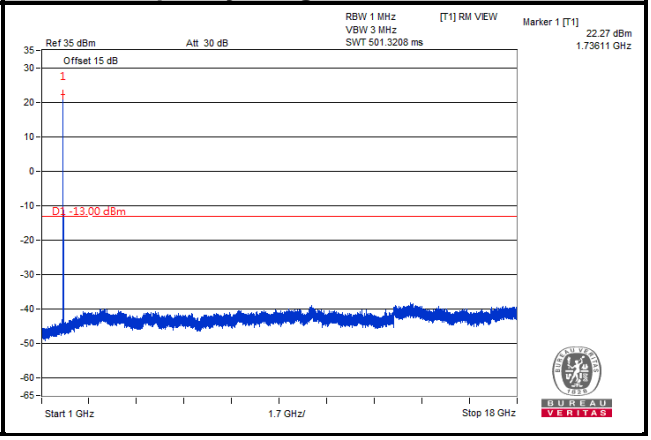
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 4	
Channel Bandwidth: 10 MHz	
Channel 20000	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20175	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20350	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	

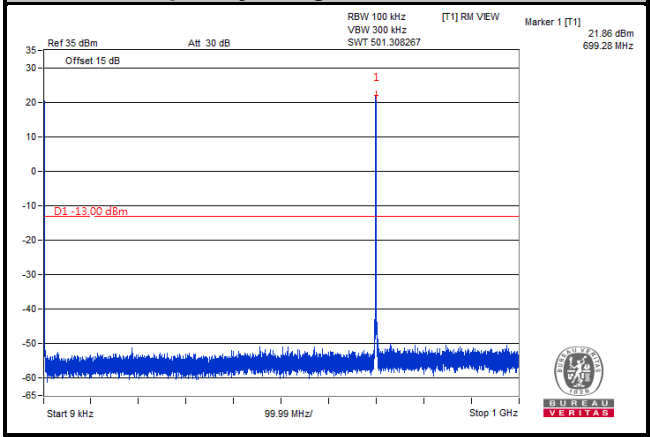
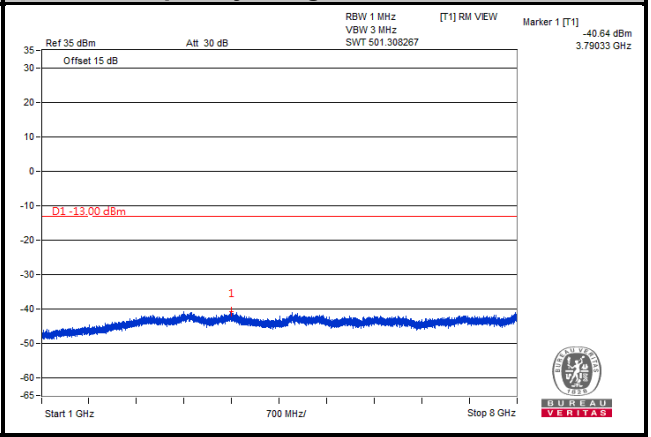
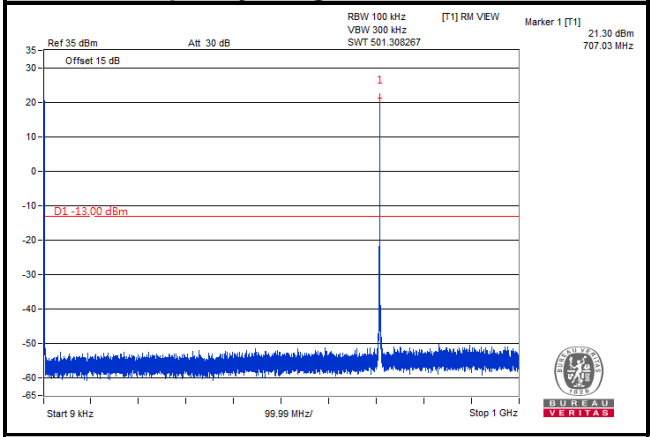
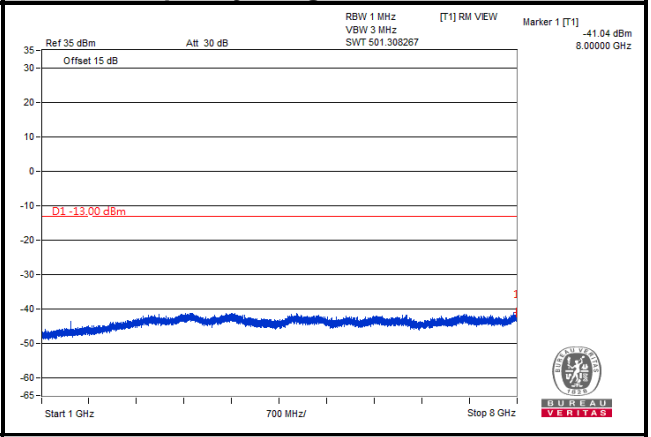
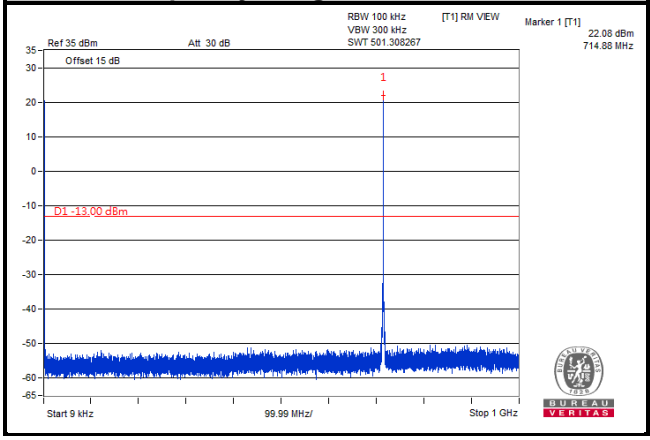
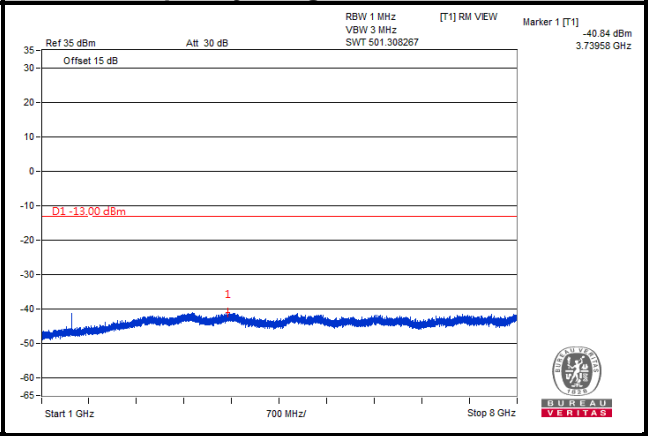
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 4	
Channel Bandwidth: 15 MHz	
Channel 20025	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20175	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20325	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	

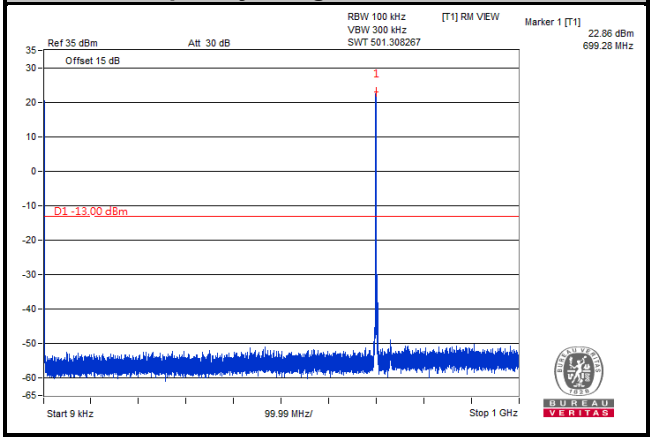
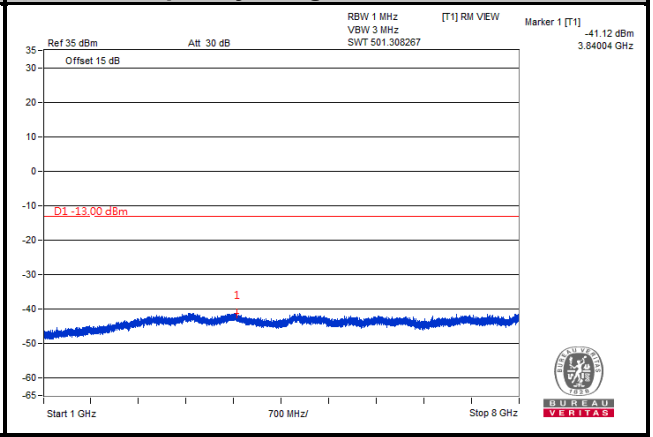
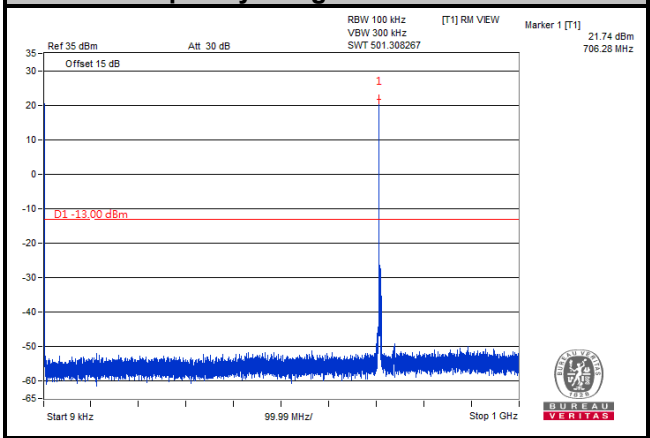
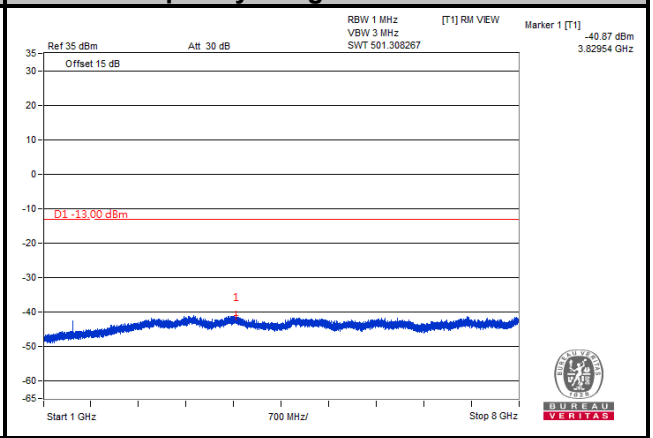
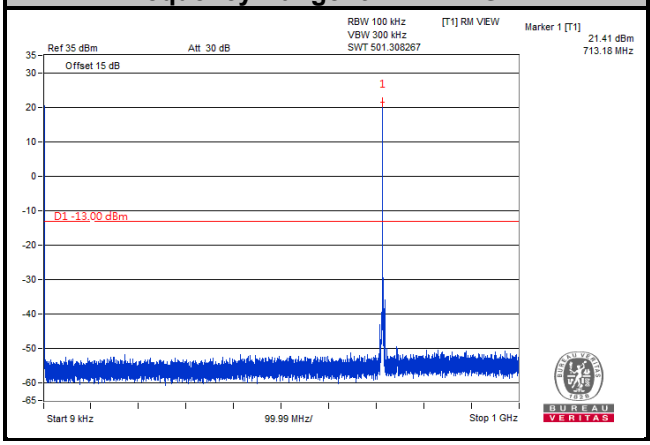
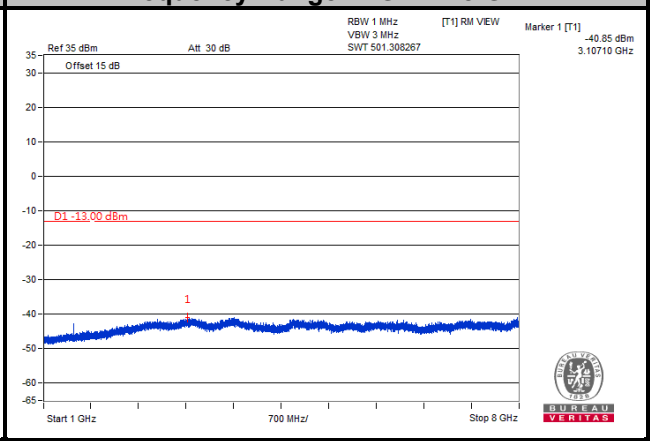
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 4	
Channel Bandwidth: 20 MHz	
Channel 20050	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20175	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	
Channel 20300	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 18 GHz
	

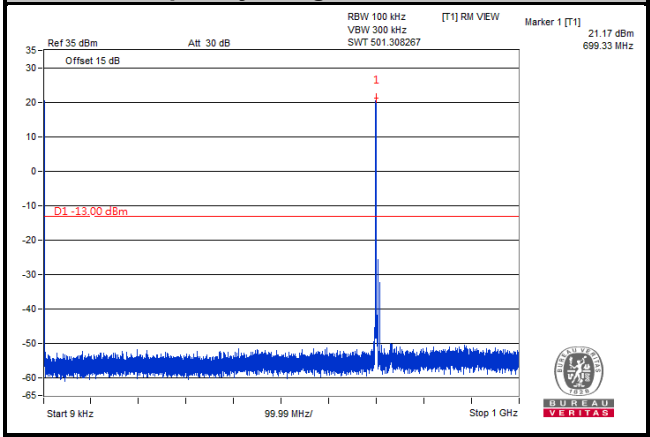
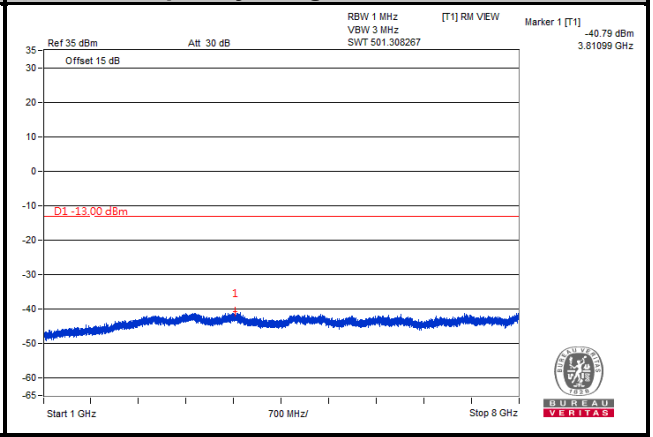
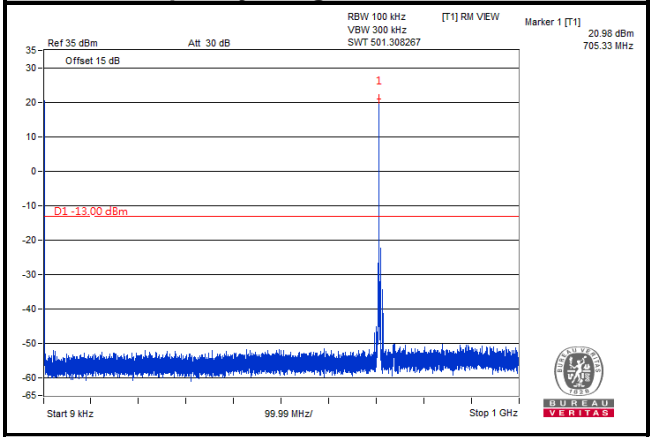
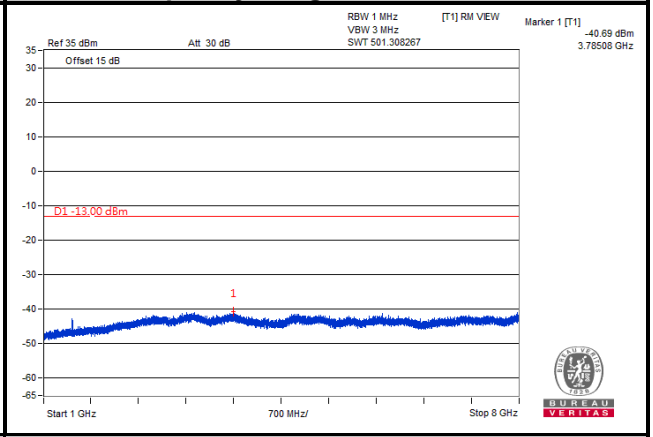
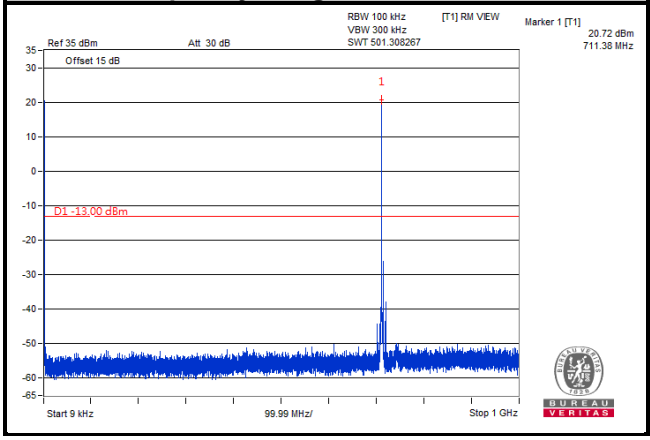
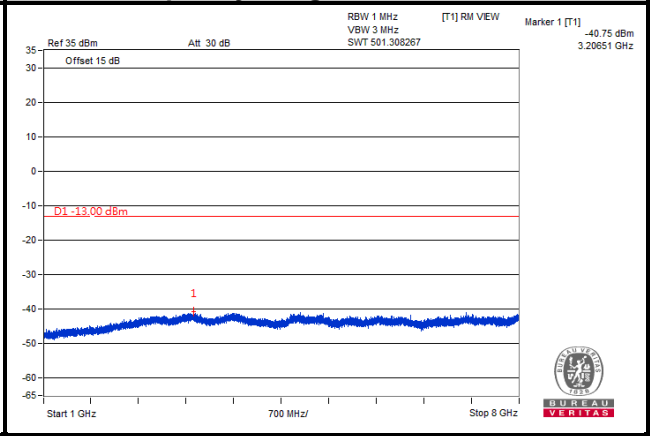
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 12	
Channel Bandwidth: 1.4 MHz	
Channel 23017	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23095	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23173	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	

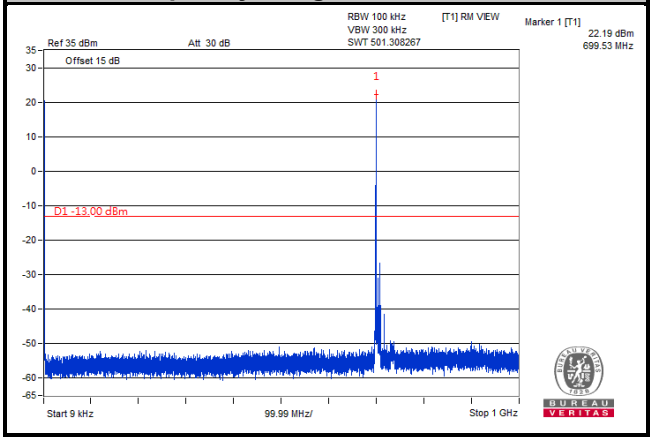
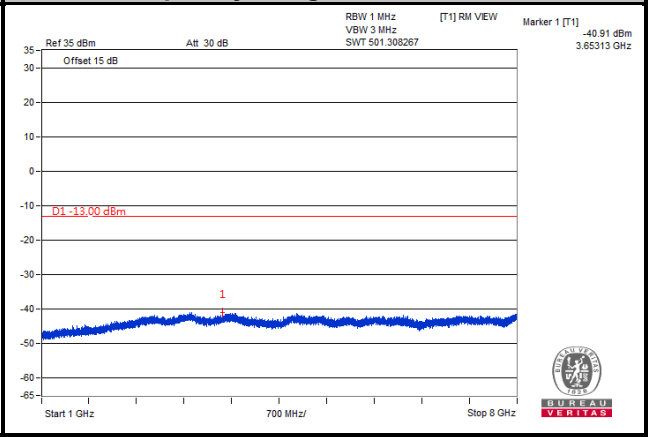
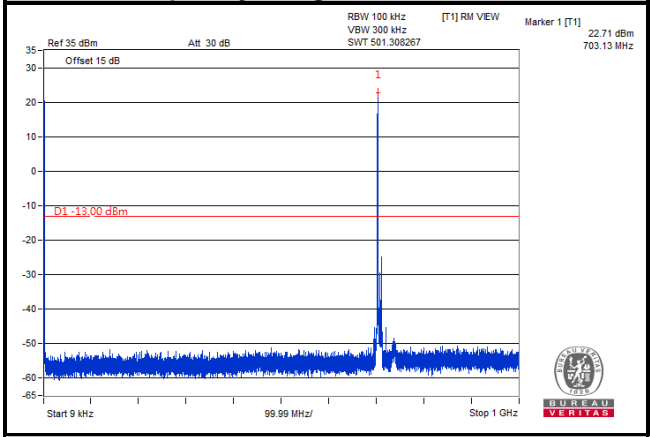
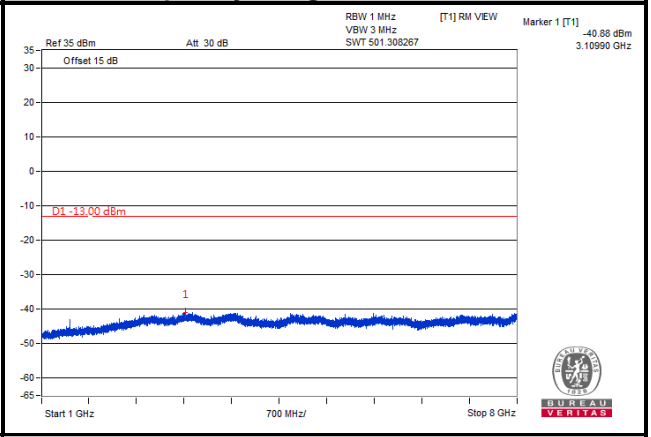
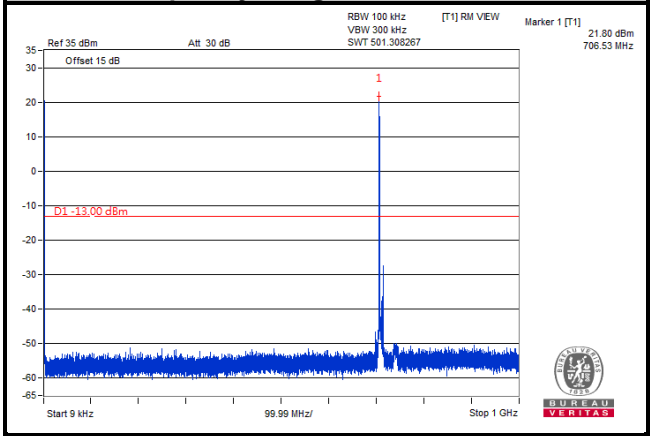
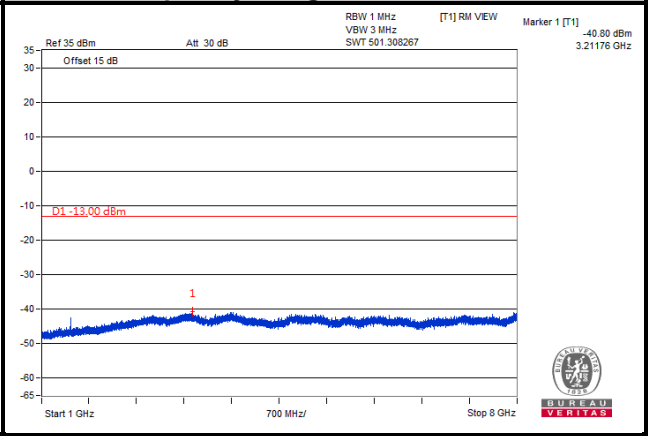
Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 12	
Channel Bandwidth: 3 MHz	
Channel 23025	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23095	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23165	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	

Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 12	
Channel Bandwidth: 5 MHz	
Channel 23035	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23095	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23155	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	

Note: The signal over the limit in 9 kHz is from spectrum analyzer.

LTE Band 12	
Channel Bandwidth: 10 MHz	
Channel 23060	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23095	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	
Channel 23130	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 8 GHz
	

Note: The signal over the limit in 9 kHz is from spectrum analyzer.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

a. The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The limit of emission is equal to -13 dBm.

4.8.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
b. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
c. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15 dB.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

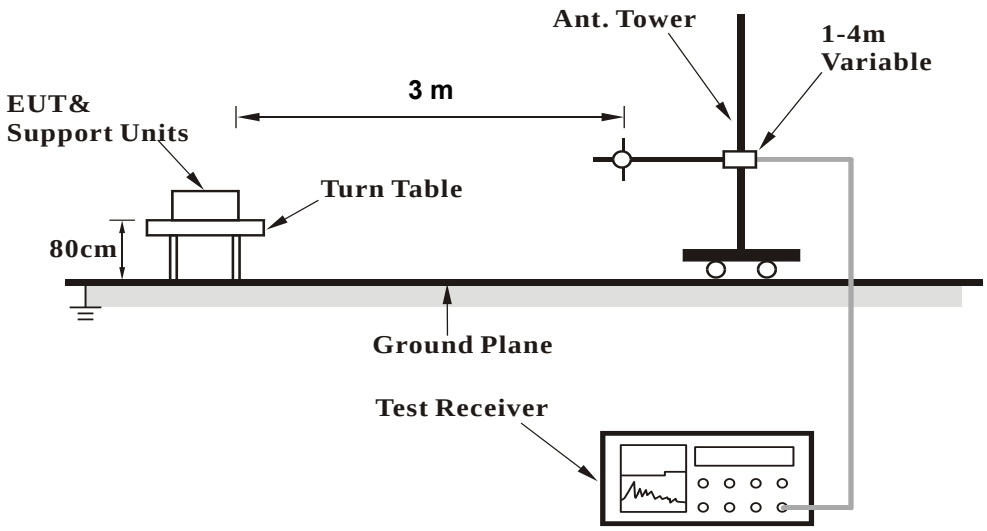
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

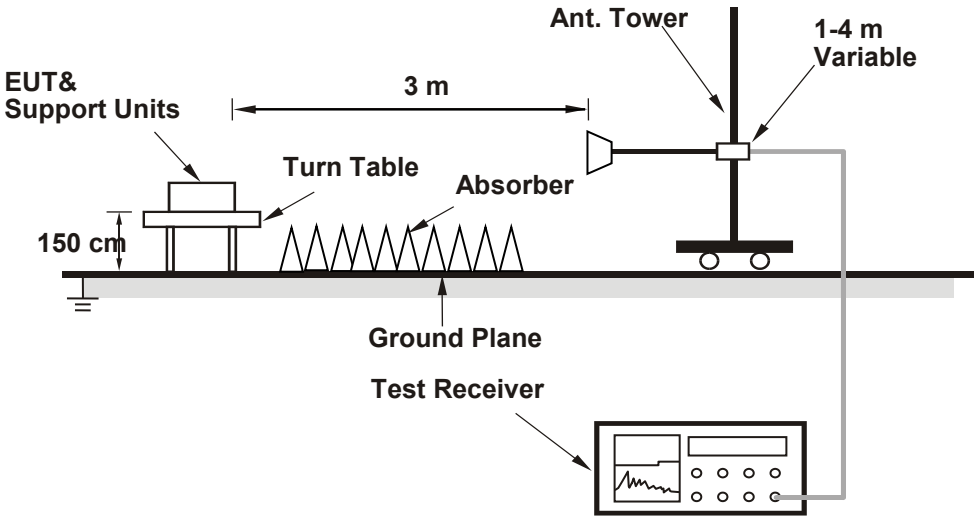
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 Test Results

Mode A

WCDMA:

Low Channel

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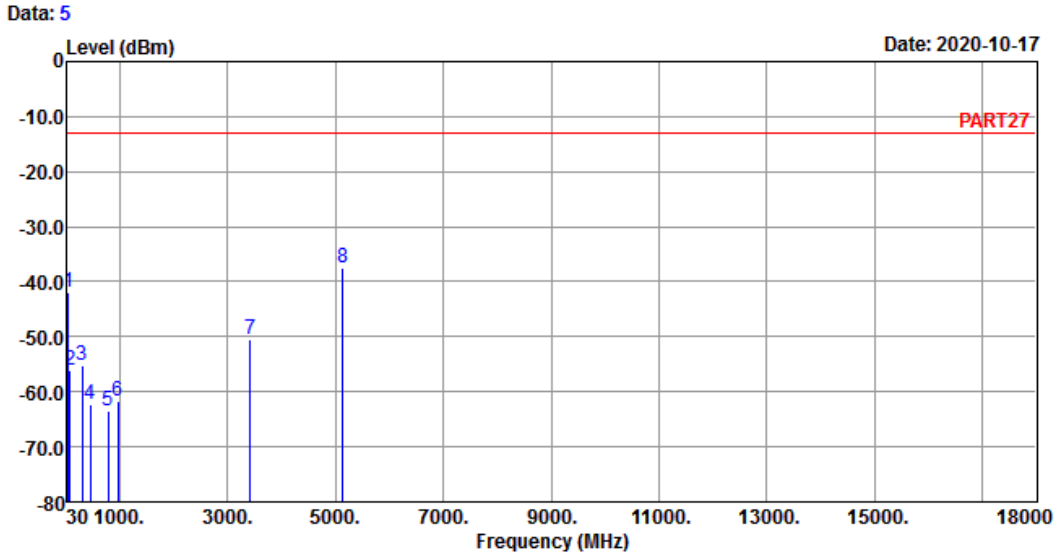
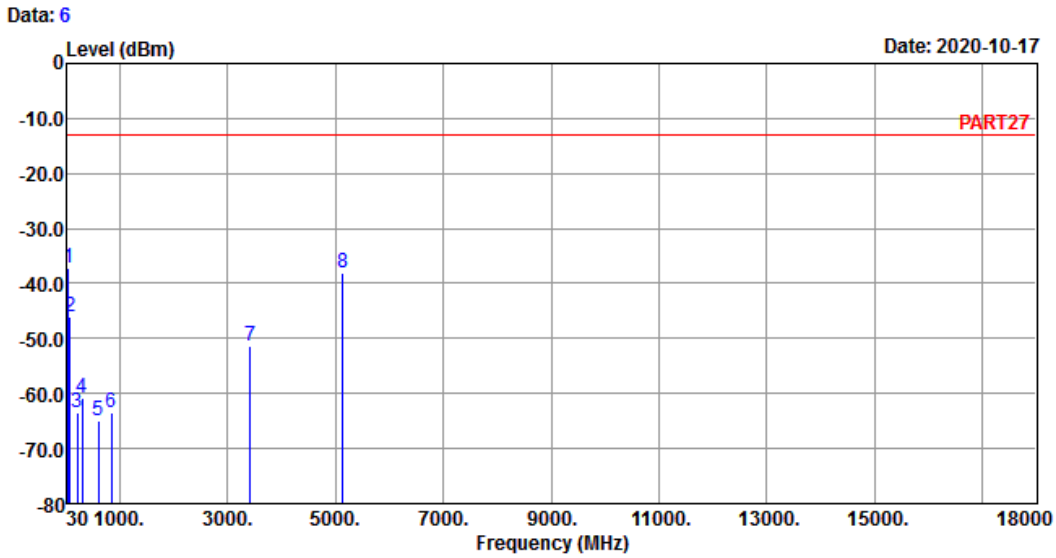


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : WCDMA Band 4 Link_L-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	43.58	-41.96	-40.49	-13.00	-1.47	-28.96	Peak
2	76.56	-55.97	-45.99	-13.00	-9.98	-42.97	Peak
3	308.39	-55.30	-48.42	-13.00	-6.88	-42.30	Peak
4	450.01	-62.28	-56.73	-13.00	-5.55	-49.28	Peak
5	781.75	-63.36	-64.15	-13.00	0.79	-50.36	Peak
6	970.90	-61.76	-64.31	-13.00	2.55	-48.76	Peak
7	3424.80	-50.34	-42.00	-13.00	-8.34	-37.34	Peak
8 pp	5137.20	-37.34	-35.60	-13.00	-1.74	-24.34	Peak



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : WCDMA Band 4 Link_L-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	42.61	-37.22	-36.28	-13.00	-0.94	-24.22	Peak
2	76.56	-46.18	-36.20	-13.00	-9.98	-33.18	Peak
3	211.39	-63.47	-55.92	-13.00	-7.55	-50.47	Peak
4	309.36	-60.72	-53.86	-13.00	-6.86	-47.72	Peak
5	600.36	-64.89	-64.14	-13.00	-0.75	-51.89	Peak
6	852.56	-63.52	-63.83	-13.00	0.31	-50.52	Peak
7	3424.80	-51.39	-43.05	-13.00	-8.34	-38.39	Peak
8	5137.20	-38.01	-36.27	-13.00	-1.74	-25.01	Peak

Middle Channel

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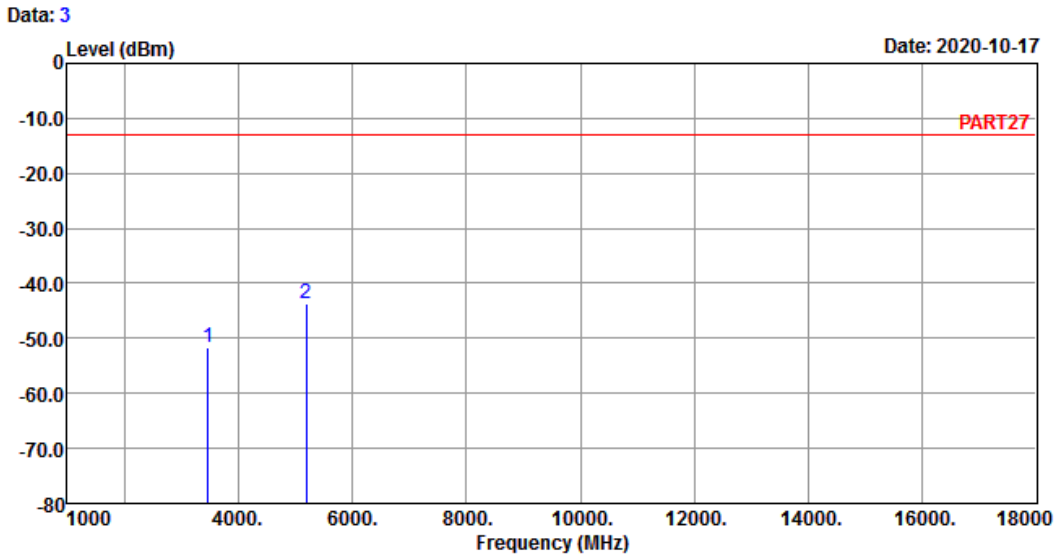
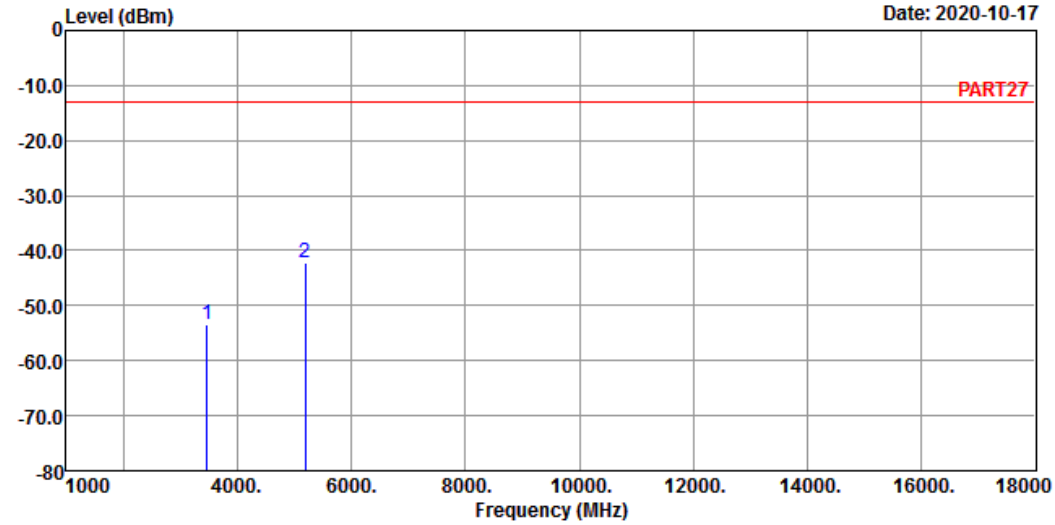


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : WCDMA Band 4 Link_M-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.20	-51.68	-43.80	-13.00	-7.88	-38.68	Peak
2 pp	5197.80	-43.73	-41.66	-13.00	-2.07	-30.73	Peak

Data: 4

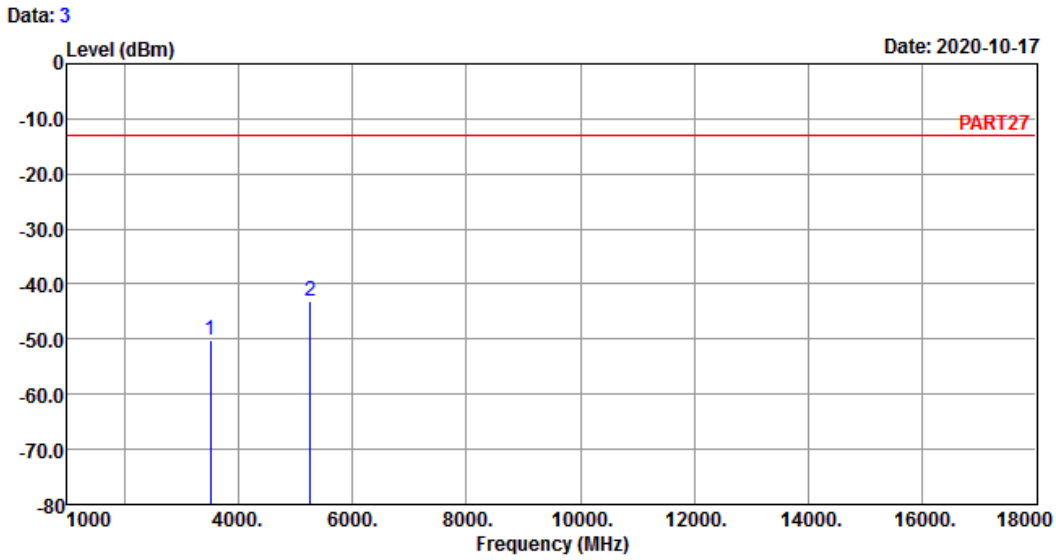


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : WCDMA Band 4 Link_M-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.20	-53.31	-45.43	-13.00	-7.88	-40.31	Peak
2 pp	5197.80	-42.34	-40.27	-13.00	-2.07	-29.34	Peak

High Channel

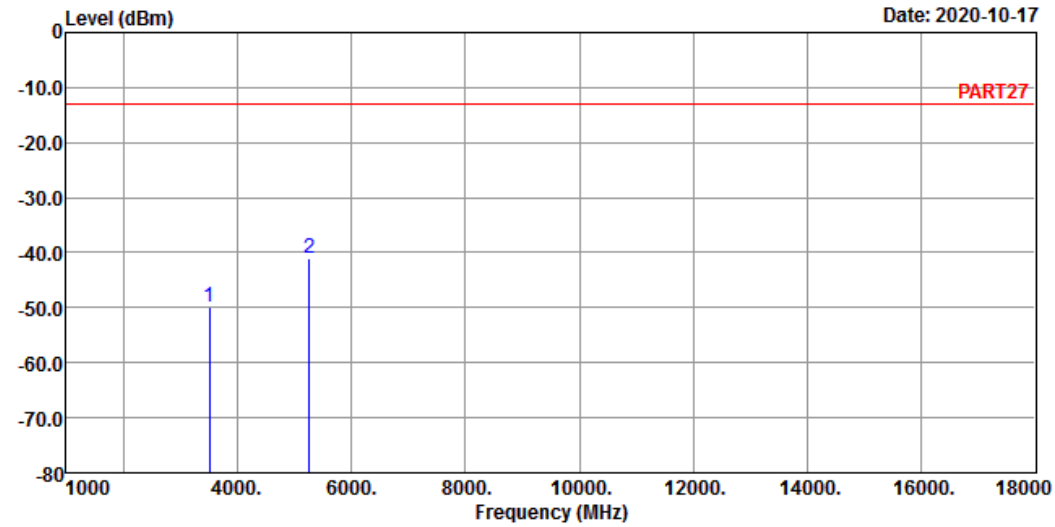
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : WCDMA Band 4 Link_H-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3505.20	-50.14	-42.69	-13.00	-7.45	-37.14	Peak
2 pp	5257.80	-42.99	-40.47	-13.00	-2.52	-29.99	Peak

Data: 4



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : WCDMA Band 4 Link_H-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3505.20	-49.93	-42.48	-13.00	-7.45	-36.93	Peak
2 pp	5257.80	-40.89	-38.37	-13.00	-2.52	-27.89	Peak

LTE Band 4

Channel Bandwidth: 1.4 MHz / QPSK

Low Channel

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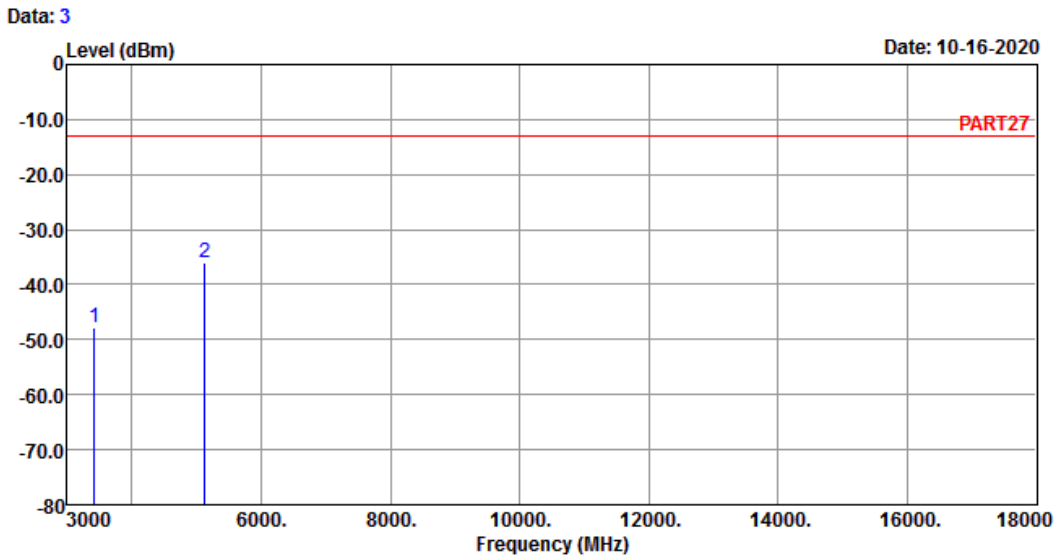
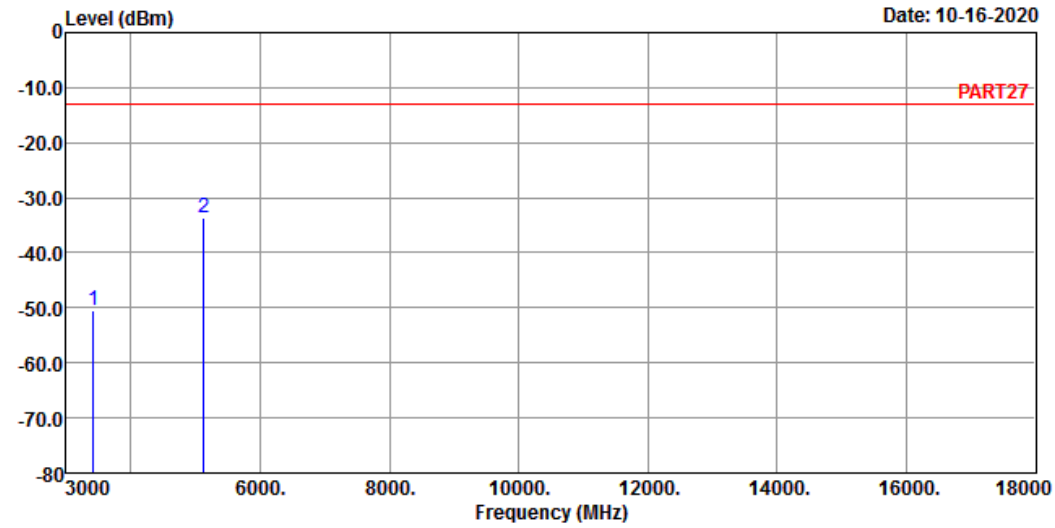


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3421.40	-47.83	-39.49	-13.00	-8.34	-34.83	Peak
2 pp	5132.10	-35.92	-34.18	-13.00	-1.74	-22.92	Peak

Data: 4

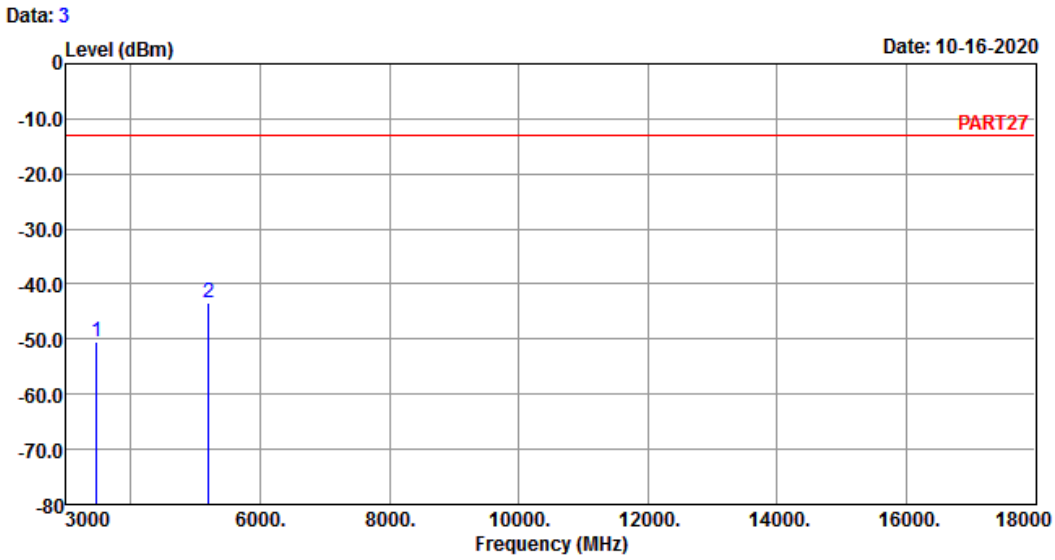


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3421.40	-50.40	-42.06	-13.00	-8.34	-37.40	Peak
2 pp	5132.10	-33.69	-31.95	-13.00	-1.74	-20.69	Peak

Middle Channel

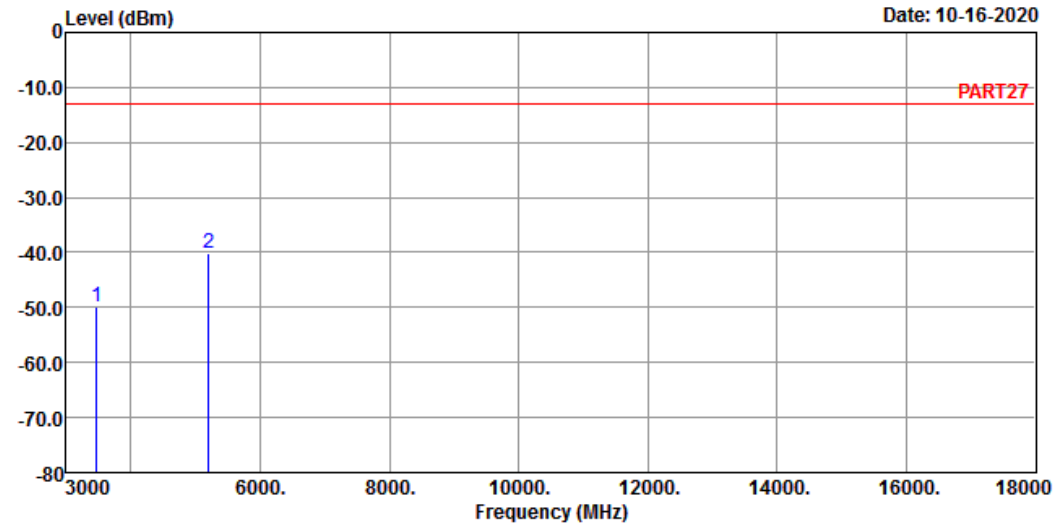
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-50.47	-42.59	-13.00	-7.88	-37.47	Peak
2 pp	5197.50	-43.54	-41.47	-13.00	-2.07	-30.54	Peak

Data: 4

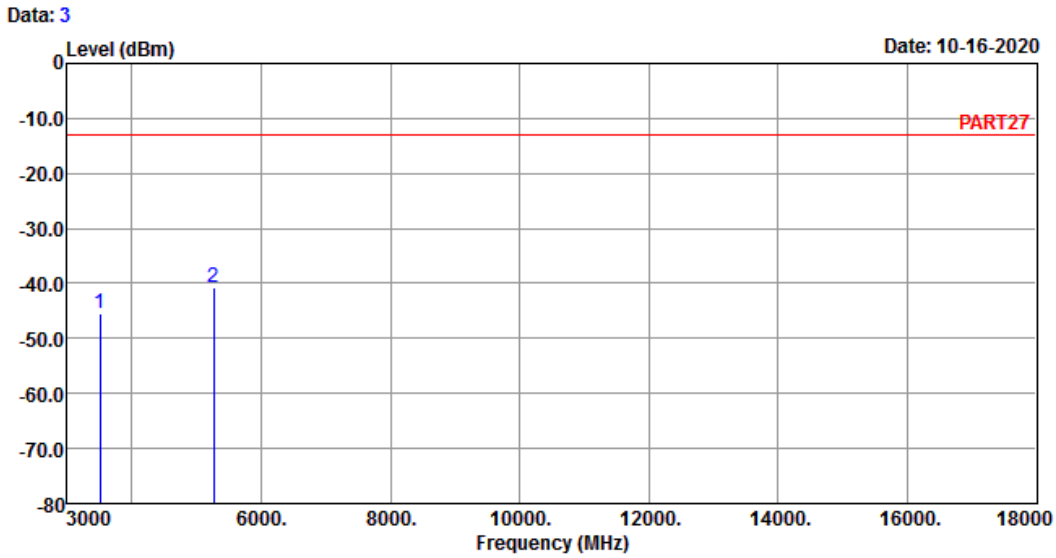


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-50.00	-42.12	-13.00	-7.88	-37.00	Peak
2 pp	5197.50	-40.06	-37.99	-13.00	-2.07	-27.06	Peak

High Channel

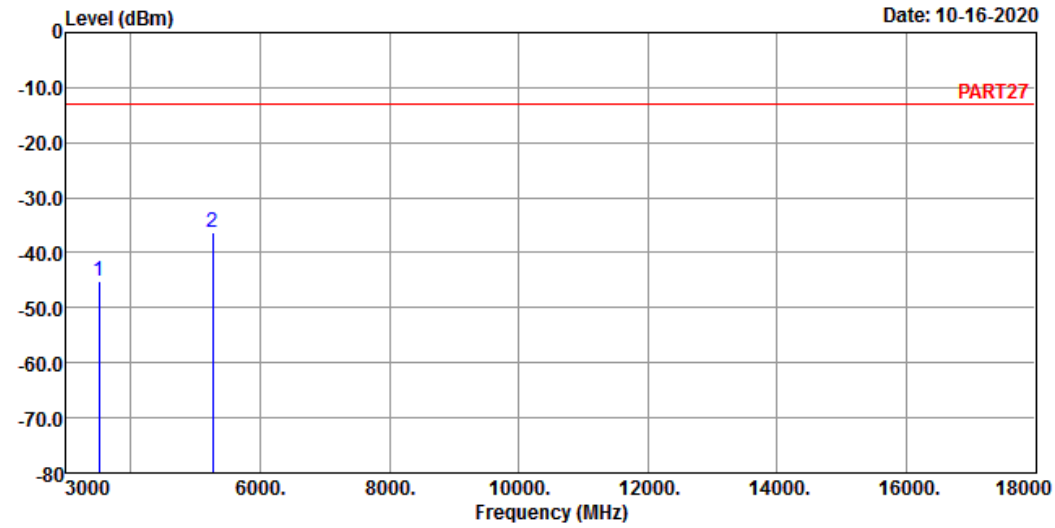
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3508.60	-45.40	-37.95	-13.00	-7.45	-32.40	Peak
2 pp	5262.90	-40.70	-38.18	-13.00	-2.52	-27.70	Peak

Data: 4



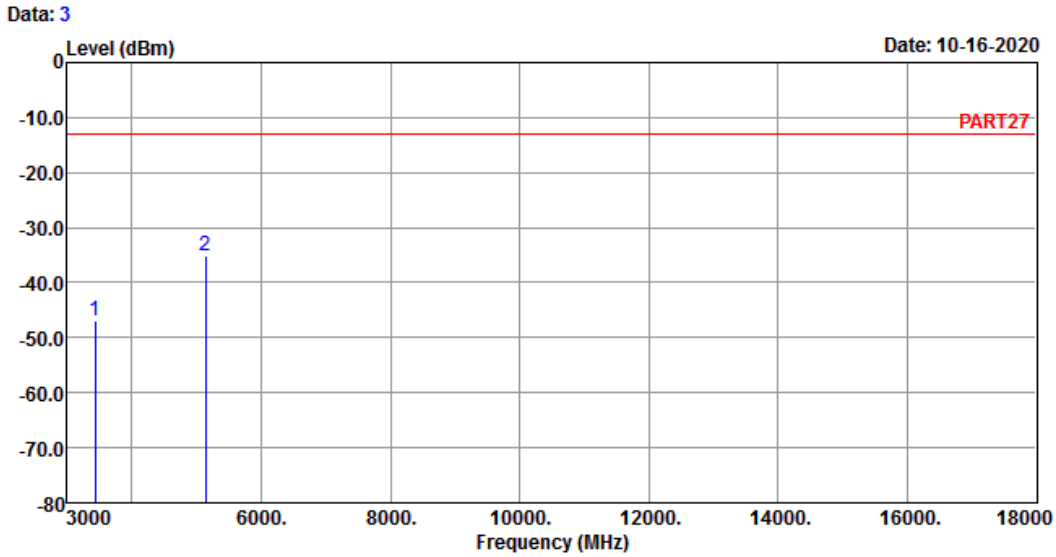
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3508.60	-45.04	-37.59	-13.00	-7.45	-32.04	Peak
2 pp	5262.90	-36.24	-33.72	-13.00	-2.52	-23.24	Peak

Channel Bandwidth: 5 MHz / QPSK

Low Channel

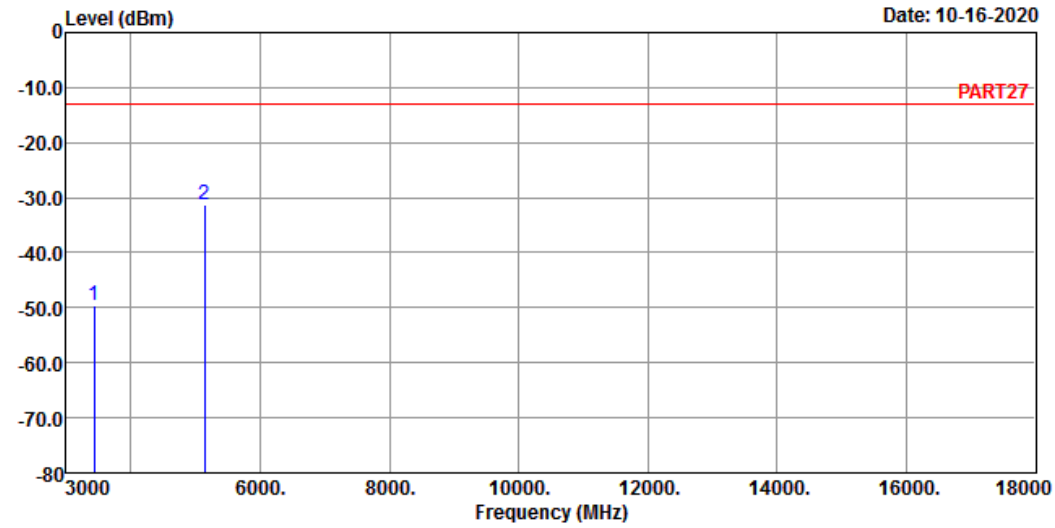
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3425.00	-46.96	-38.62	-13.00	-8.34	-33.96	Peak
2 pp	5137.50	-35.13	-33.39	-13.00	-1.74	-22.13	Peak

Data: 4

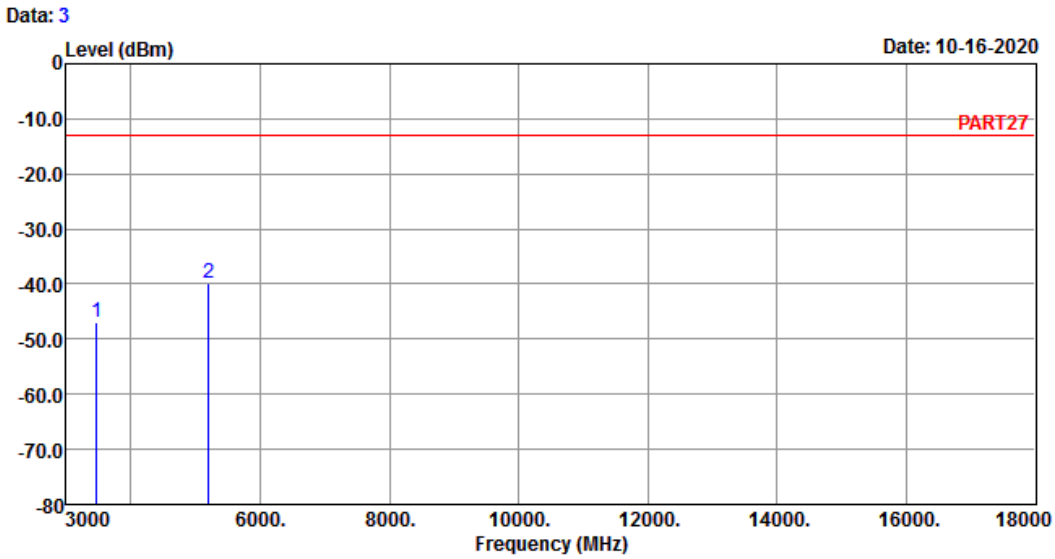


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3425.00	-49.70	-41.36	-13.00	-8.34	-36.70	Peak
2 pp	5137.50	-31.34	-29.60	-13.00	-1.74	-18.34	Peak

Middle Channel

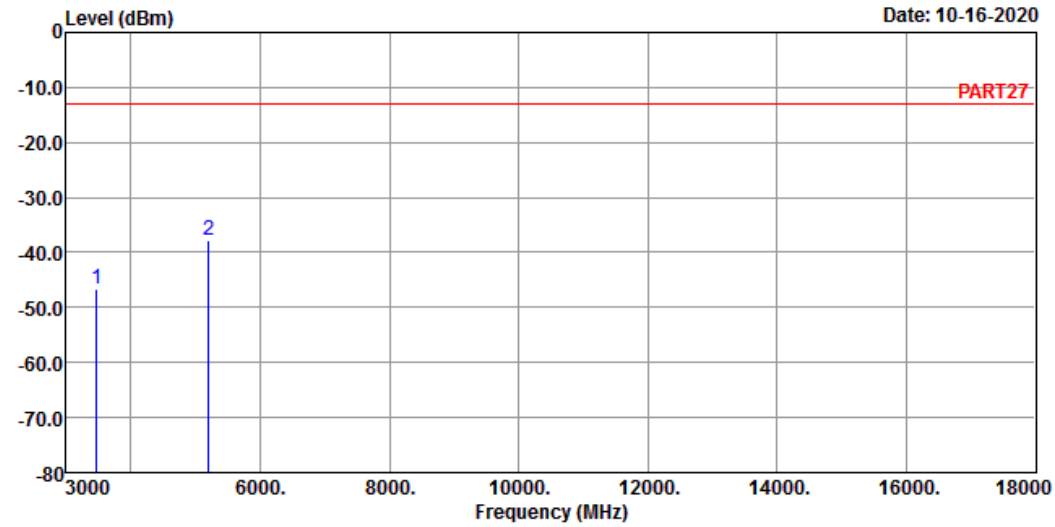
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-46.86	-38.98	-13.00	-7.88	-33.86	Peak
2 pp	5197.50	-39.83	-37.76	-13.00	-2.07	-26.83	Peak

Data: 4

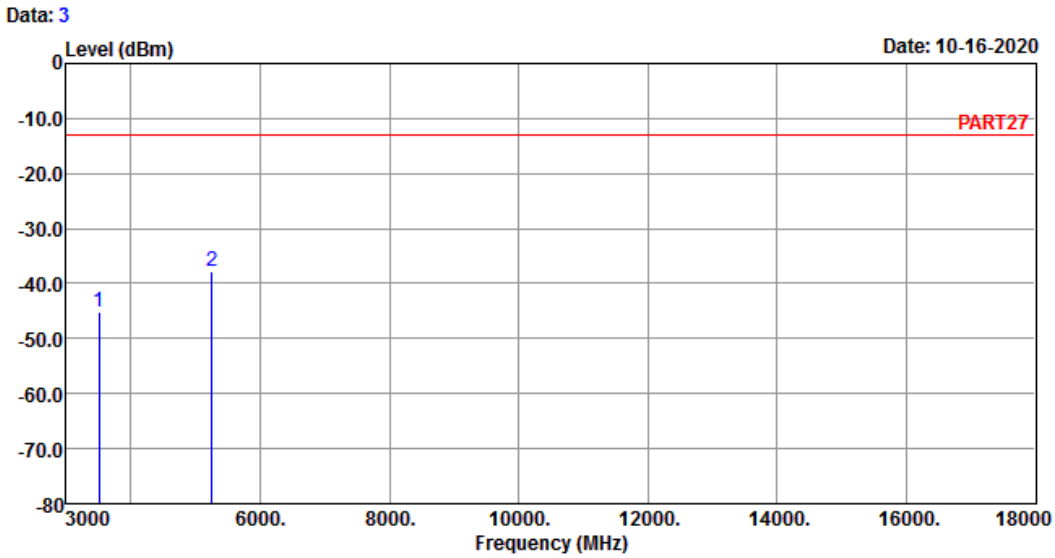


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-46.77	-38.89	-13.00	-7.88	-33.77	Peak
2 pp	5197.50	-37.81	-35.74	-13.00	-2.07	-24.81	Peak

High Channel

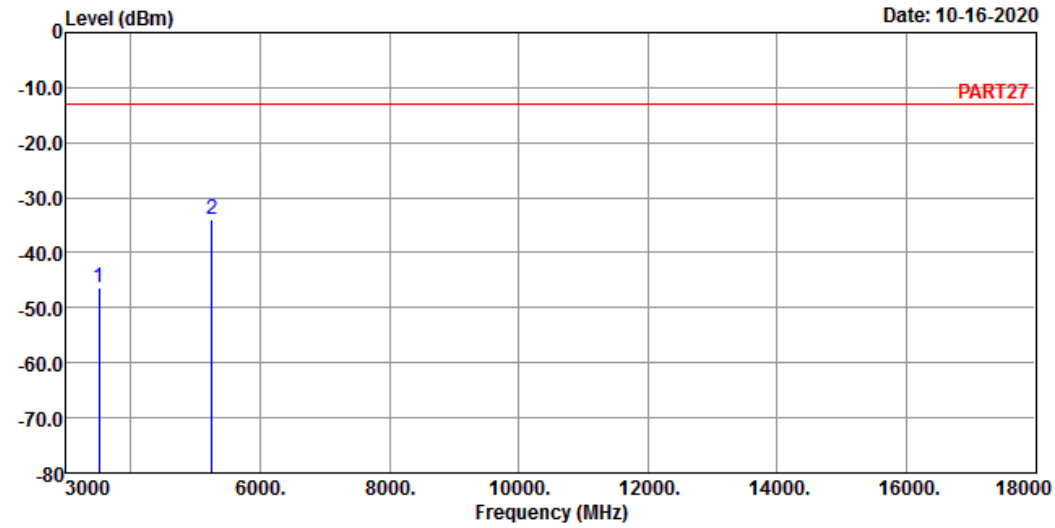
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3505.00	-45.19	-37.74	-13.00	-7.45	-32.19	Peak
2 pp	5257.50	-37.93	-35.41	-13.00	-2.52	-24.93	Peak

Data: 4



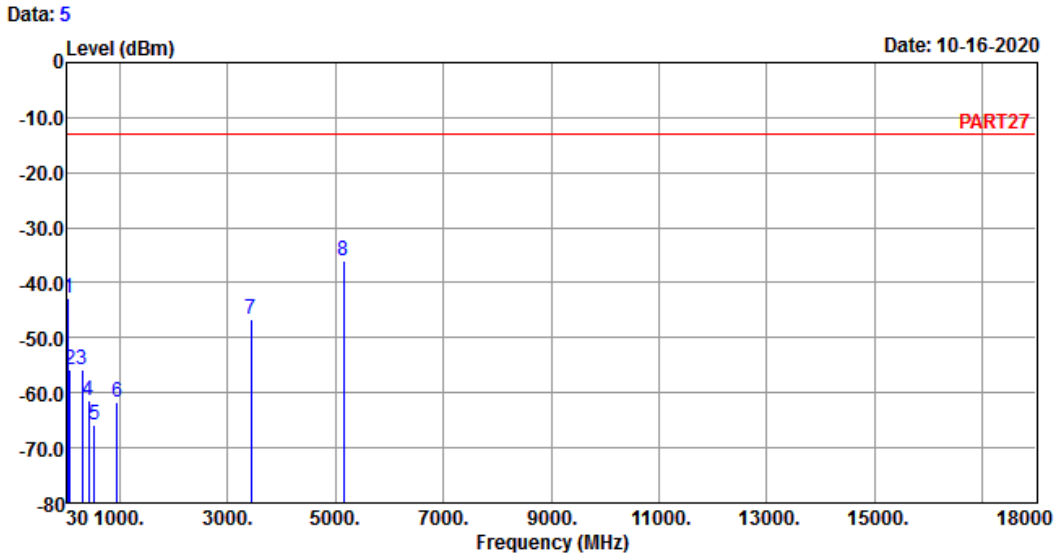
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3505.00	-46.33	-38.88	-13.00	-7.45	-33.33	Peak
2 pp	5257.50	-34.00	-31.48	-13.00	-2.52	-21.00	Peak

Channel Bandwidth: 20 MHz / QPSK

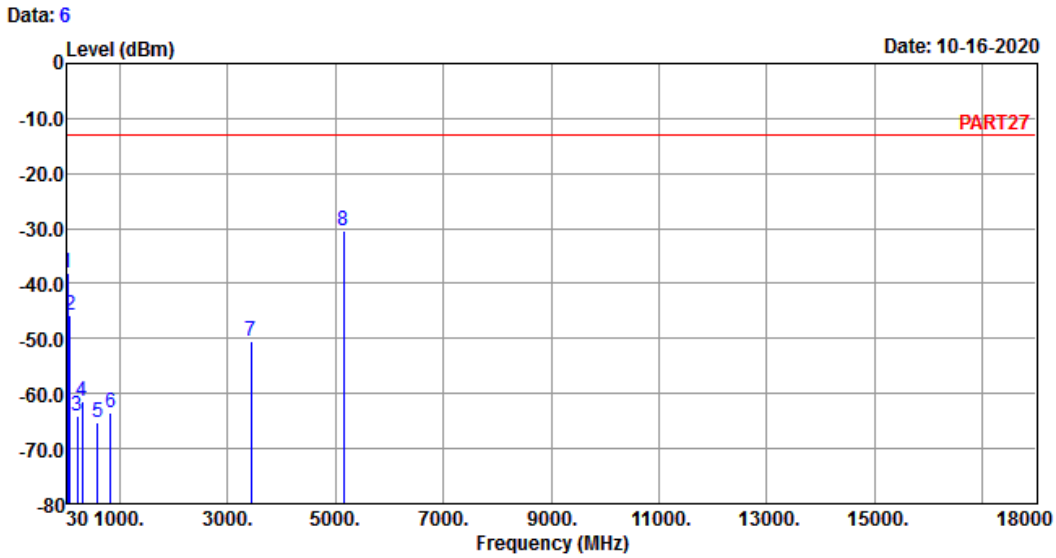
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	43.58	-42.84	-41.37	-13.00	-1.47	-29.84	Peak
2	76.56	-55.84	-45.86	-13.00	-9.98	-42.84	Peak
3	307.42	-55.75	-48.86	-13.00	-6.89	-42.75	Peak
4	419.94	-61.47	-55.68	-13.00	-5.79	-48.47	Peak
5	530.52	-65.79	-62.25	-13.00	-3.54	-52.79	Peak
6	958.29	-61.78	-63.89	-13.00	2.11	-48.78	Peak
7	3440.00	-46.59	-38.37	-13.00	-8.22	-33.59	Peak
8 pp	5160.00	-36.12	-34.21	-13.00	-1.91	-23.12	Peak

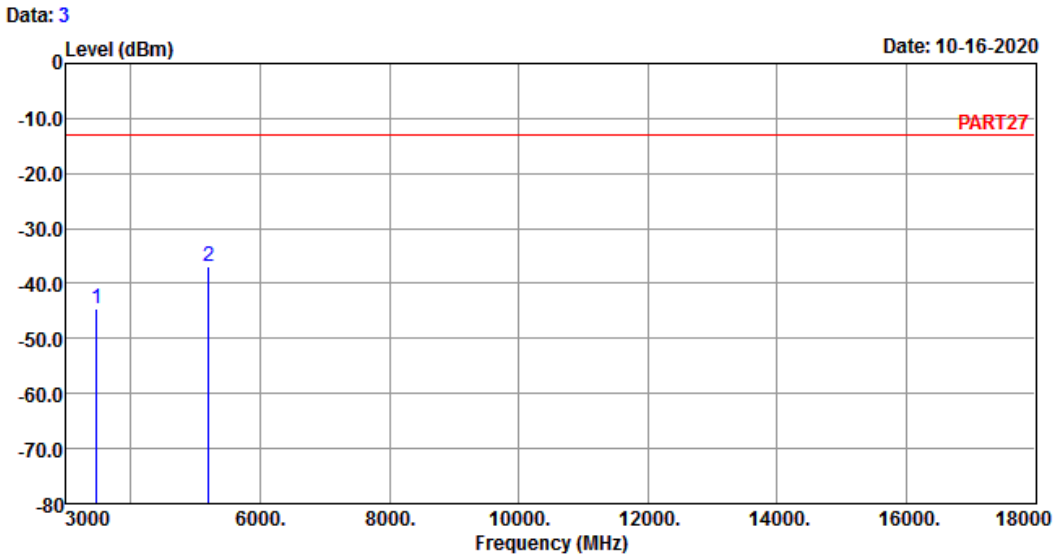


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	41.64	-38.13	-37.72	-13.00	-0.41	-25.13	Peak
2	77.53	-45.87	-35.67	-13.00	-10.20	-32.87	Peak
3	211.39	-64.03	-56.48	-13.00	-7.55	-51.03	Peak
4	309.36	-61.31	-54.45	-13.00	-6.86	-48.31	Peak
5	596.48	-65.32	-64.41	-13.00	-0.91	-52.32	Peak
6	835.10	-63.32	-63.74	-13.00	0.42	-50.32	Peak
7	3440.00	-50.47	-42.25	-13.00	-8.22	-37.47	Peak
8 pp	5160.00	-30.54	-28.63	-13.00	-1.91	-17.54	Peak

Middle Channel

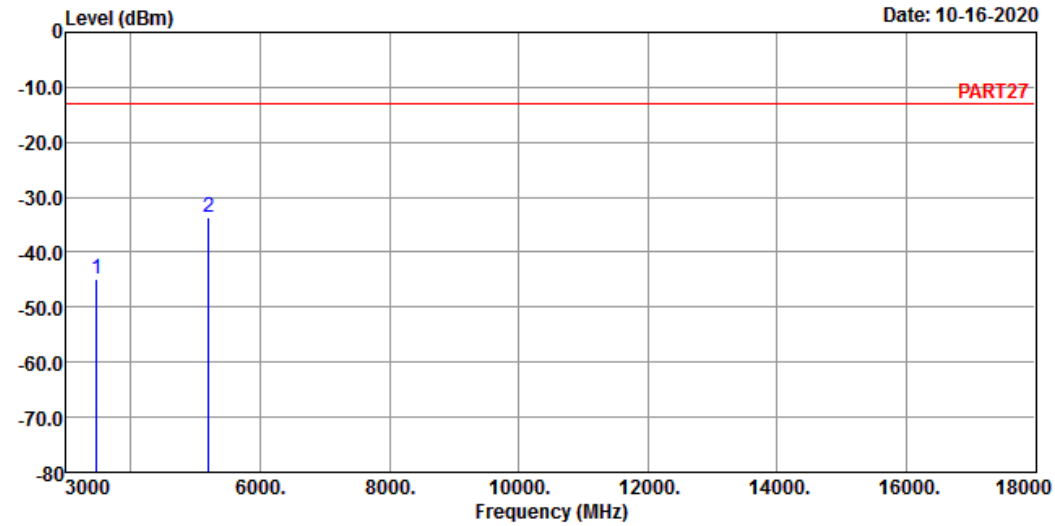
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-44.51	-36.63	-13.00	-7.88	-31.51	Peak
2 pp	5197.50	-37.01	-34.94	-13.00	-2.07	-24.01	Peak

Data: 4

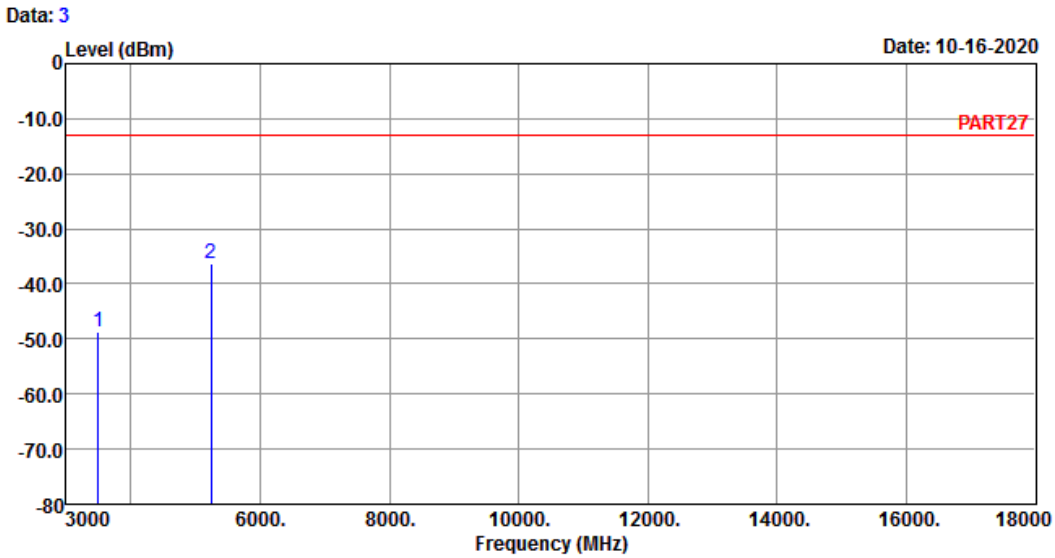


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-44.80	-36.92	-13.00	-7.88	-31.80	Peak
2 pp	5197.50	-33.73	-31.66	-13.00	-2.07	-20.73	Peak

High Channel

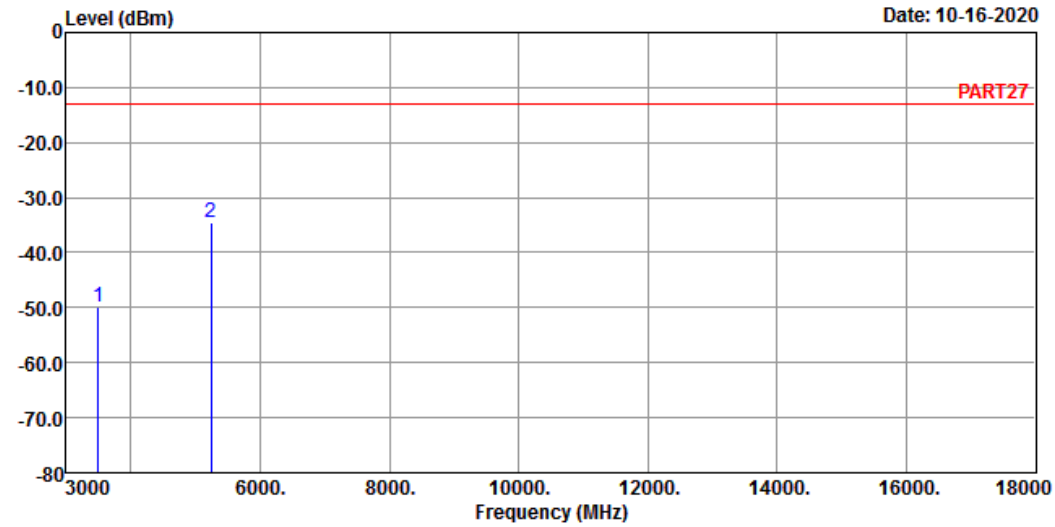
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3490.00	-48.63	-40.98	-13.00	-7.65	-35.63	Peak
2 pp	5235.00	-36.29	-33.88	-13.00	-2.41	-23.29	Peak

Data: 4



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M Link_H-CH
Tested by: Cyril Chen

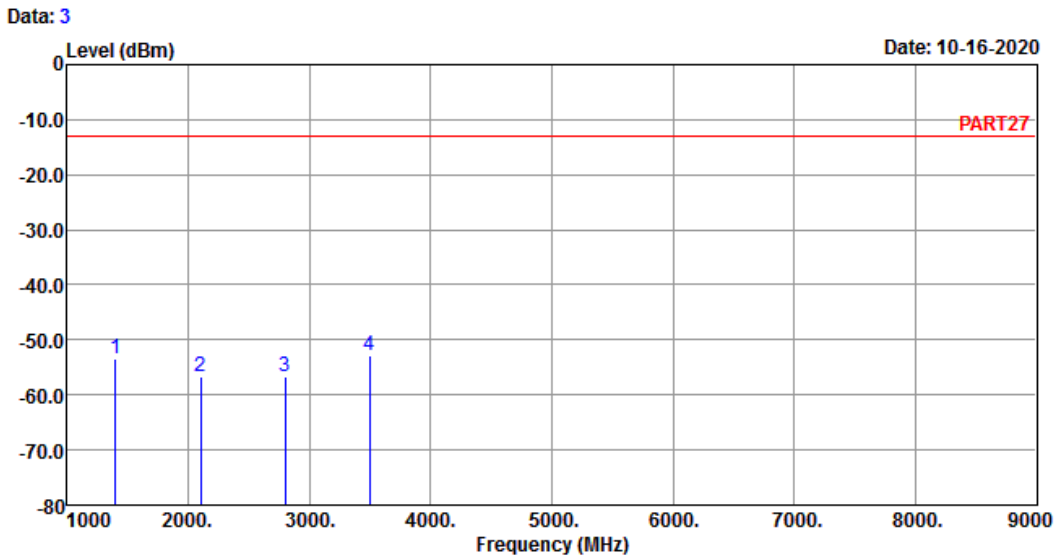
	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3490.00	-49.98	-42.33	-13.00	-7.65	-36.98	Peak
2 pp	5235.00	-34.41	-32.00	-13.00	-2.41	-21.41	Peak

LTE Band 12

Channel Bandwidth: 1.4 MHz / QPSK

Low Channel

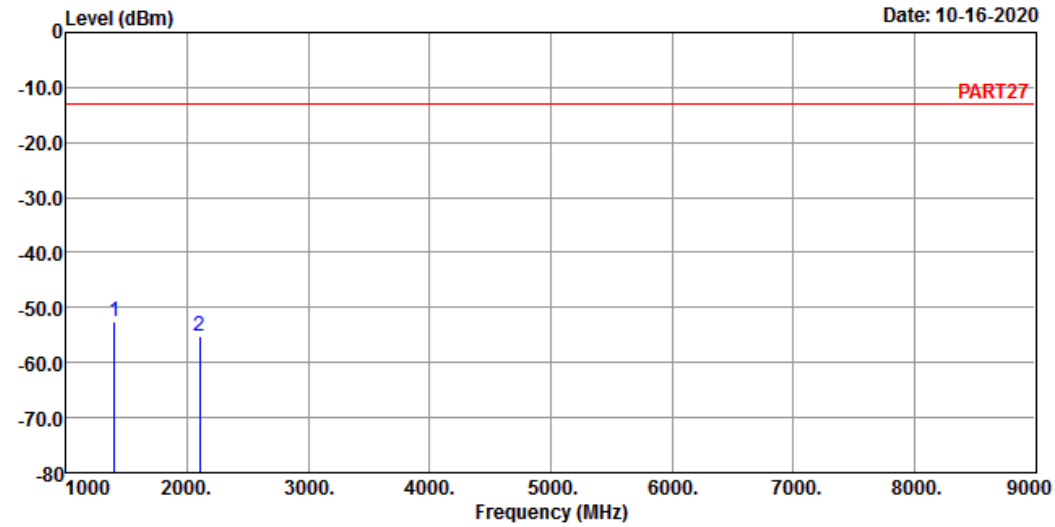
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1399.40	-53.55	-41.70	-13.00	-11.85	-40.55	Peak
2	2099.10	-56.66	-46.50	-13.00	-10.16	-43.66	Peak
3	2798.80	-56.62	-48.10	-13.00	-8.52	-43.62	Peak
4 pp	3498.50	-52.83	-45.30	-13.00	-7.53	-39.83	Peak

Data: 4

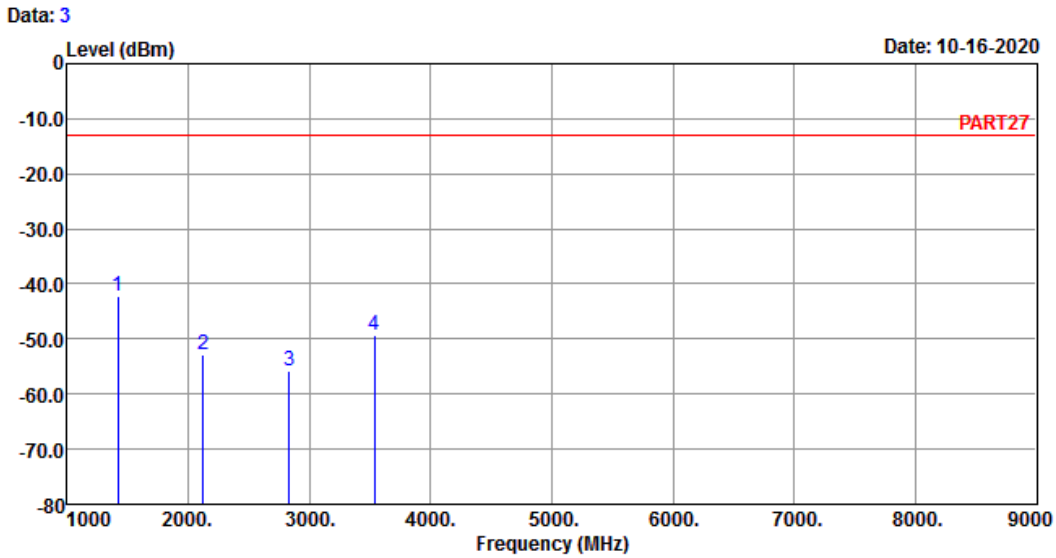


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1399.40	-52.50	-40.65	-13.00	-11.85	-39.50	Peak
2	2099.10	-55.32	-45.16	-13.00	-10.16	-42.32	Peak

Middle Channel

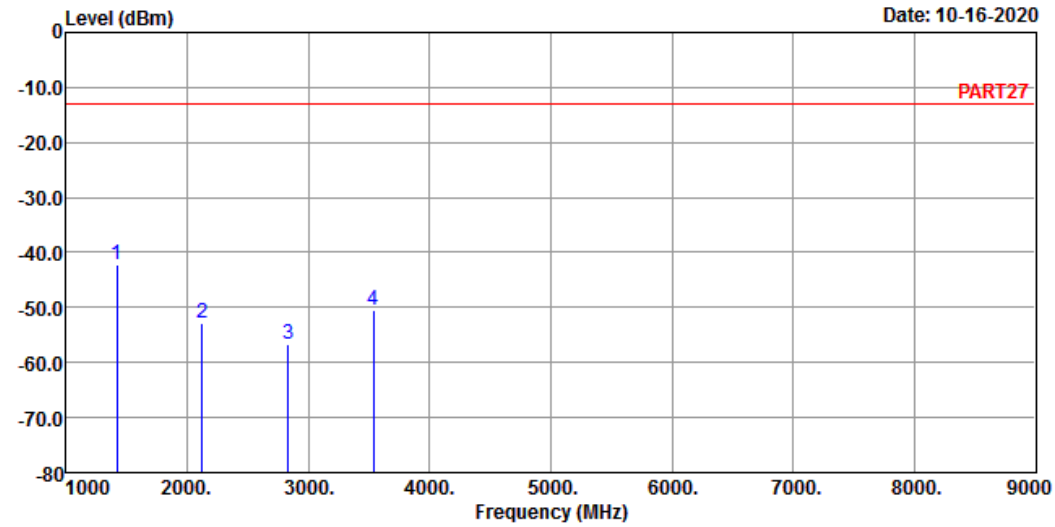
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-42.31	-30.23	-13.00	-12.08	-29.31	Peak
2	2122.50	-52.78	-42.91	-13.00	-9.87	-39.78	Peak
3	2830.00	-55.74	-47.26	-13.00	-8.48	-42.74	Peak
4	3537.50	-49.32	-42.10	-13.00	-7.22	-36.32	Peak

Data: 4

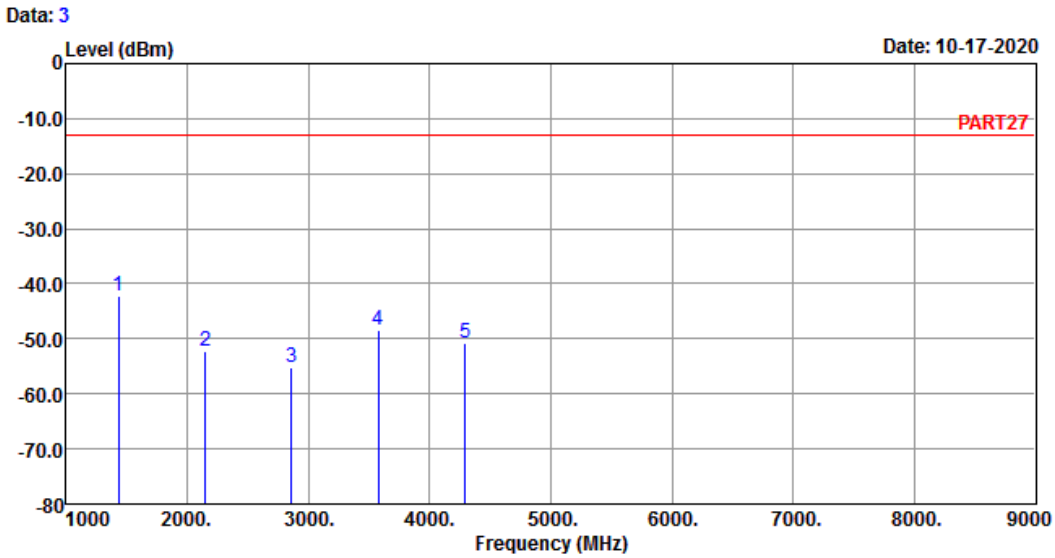


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-42.24	-30.16	-13.00	-12.08	-29.24	Peak
2	2122.50	-52.88	-43.01	-13.00	-9.87	-39.88	Peak
3	2830.00	-56.76	-48.28	-13.00	-8.48	-43.76	Peak
4	3537.50	-50.49	-43.27	-13.00	-7.22	-37.49	Peak

High Channel

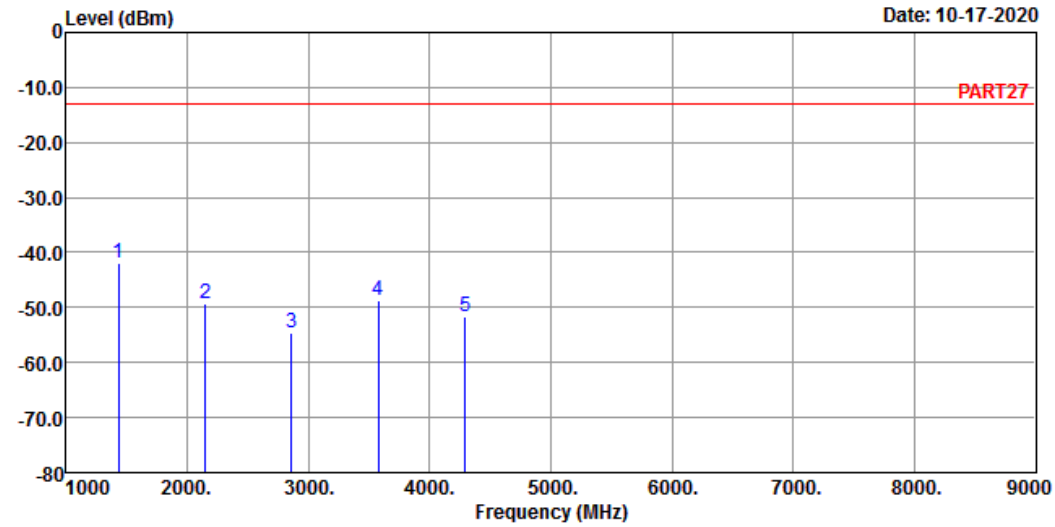
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1430.60	-42.16	-29.85	-13.00	-12.31	-29.16	Peak
2	2145.90	-52.40	-42.93	-13.00	-9.47	-39.40	Peak
3	2861.20	-55.15	-46.72	-13.00	-8.43	-42.15	Peak
4	3576.50	-48.39	-41.40	-13.00	-6.99	-35.39	Peak
5	4291.80	-50.87	-45.38	-13.00	-5.49	-37.87	Peak

Data: 4



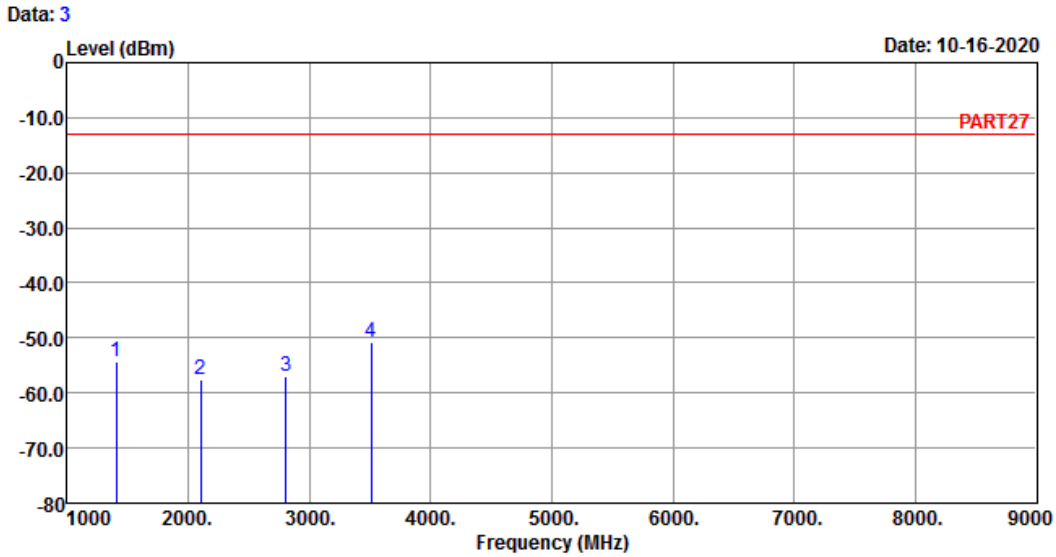
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1430.60	-41.81	-29.50	-13.00	-12.31	-28.81	Peak
2	2145.90	-49.33	-39.86	-13.00	-9.47	-36.33	Peak
3	2861.20	-54.71	-46.28	-13.00	-8.43	-41.71	Peak
4	3576.50	-48.59	-41.60	-13.00	-6.99	-35.59	Peak
5	4291.80	-51.60	-46.11	-13.00	-5.49	-38.60	Peak

Channel Bandwidth: 5 MHz / QPSK

Low Channel

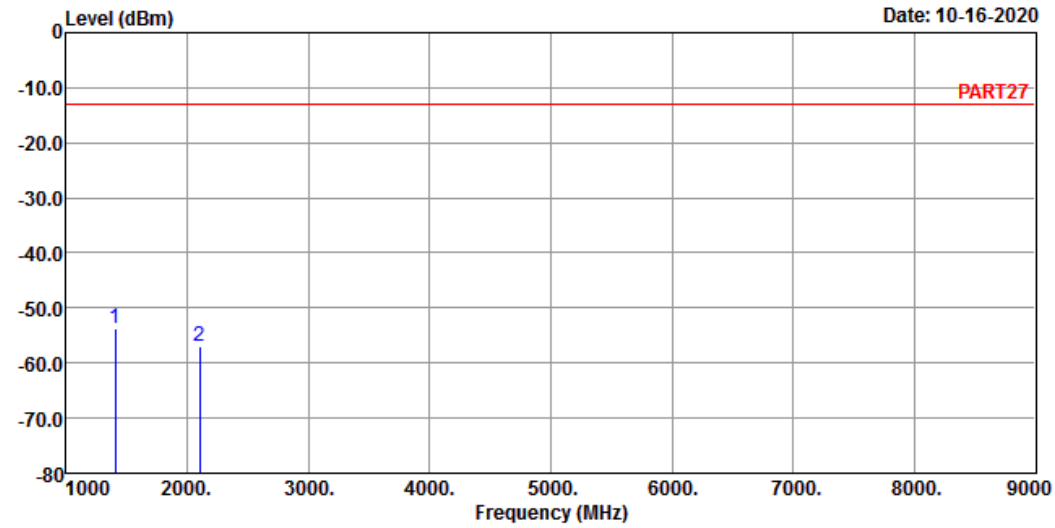
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1403.00	-54.29	-42.38	-13.00	-11.91	-41.29	Peak
2	2104.50	-57.63	-47.47	-13.00	-10.16	-44.63	Peak
3	2806.00	-56.84	-48.32	-13.00	-8.52	-43.84	Peak
4 pp	3507.50	-50.69	-43.24	-13.00	-7.45	-37.69	Peak

Data: 4

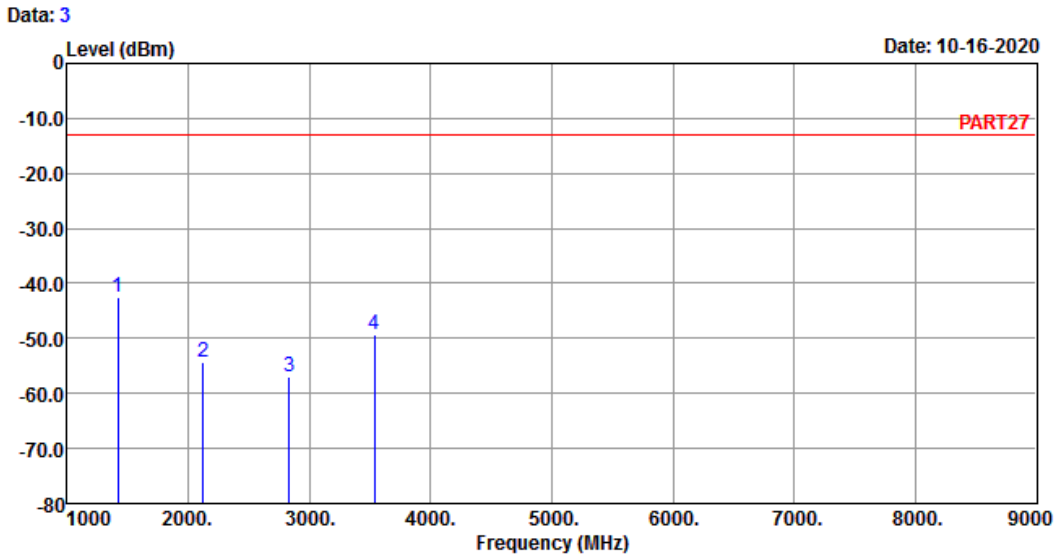


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1403.00	-53.68	-41.77	-13.00	-11.91	-40.68	Peak
2	2104.50	-56.95	-46.79	-13.00	-10.16	-43.95	Peak

Middle Channel

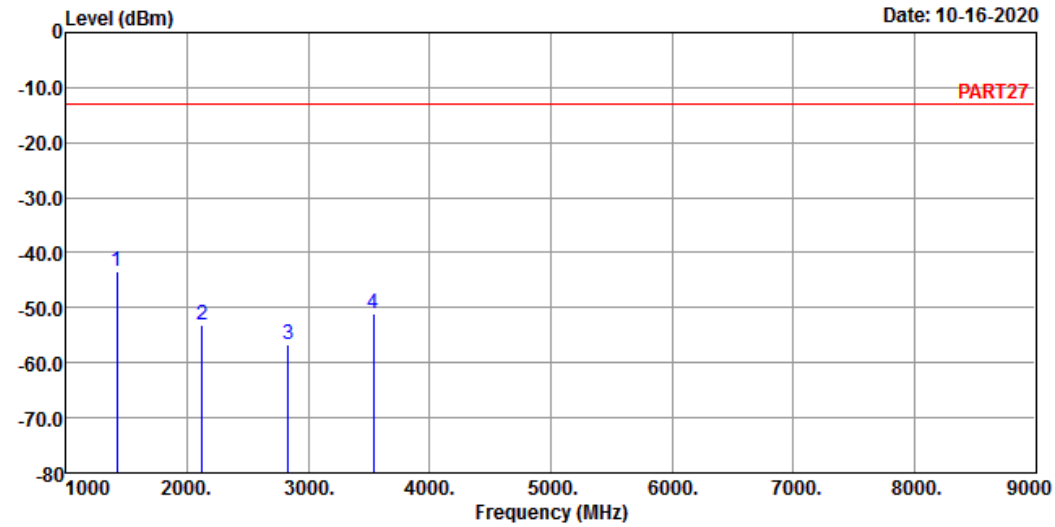
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-42.48	-30.40	-13.00	-12.08	-29.48	Peak
2	2122.50	-54.21	-44.34	-13.00	-9.87	-41.21	Peak
3	2830.00	-56.94	-48.46	-13.00	-8.48	-43.94	Peak
4	3537.50	-49.35	-42.13	-13.00	-7.22	-36.35	Peak

Data: 4

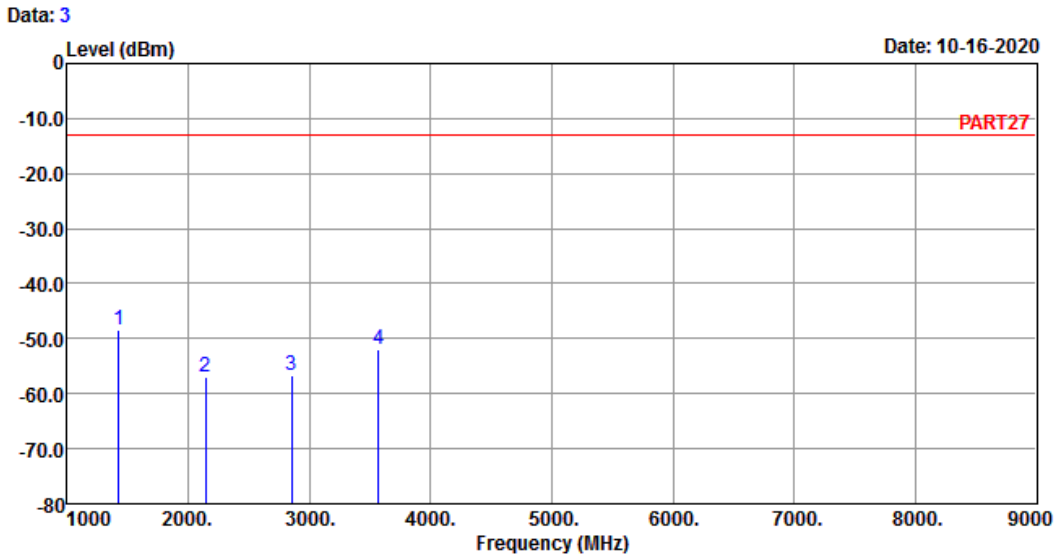


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-43.44	-31.36	-13.00	-12.08	-30.44	Peak
2	2122.50	-53.28	-43.41	-13.00	-9.87	-40.28	Peak
3	2830.00	-56.62	-48.14	-13.00	-8.48	-43.62	Peak
4	3537.50	-51.06	-43.84	-13.00	-7.22	-38.06	Peak

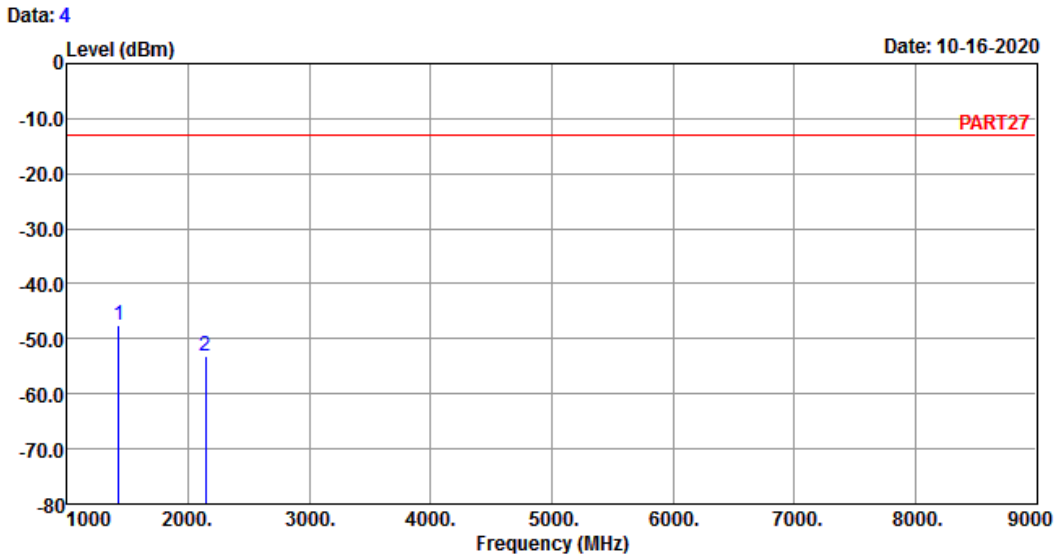
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1427.00	-48.48	-36.23	-13.00	-12.25	-35.48	Peak
2	2140.50	-56.86	-47.29	-13.00	-9.57	-43.86	Peak
3	2854.00	-56.59	-48.15	-13.00	-8.44	-43.59	Peak
4	3567.50	-52.06	-45.07	-13.00	-6.99	-39.06	Peak



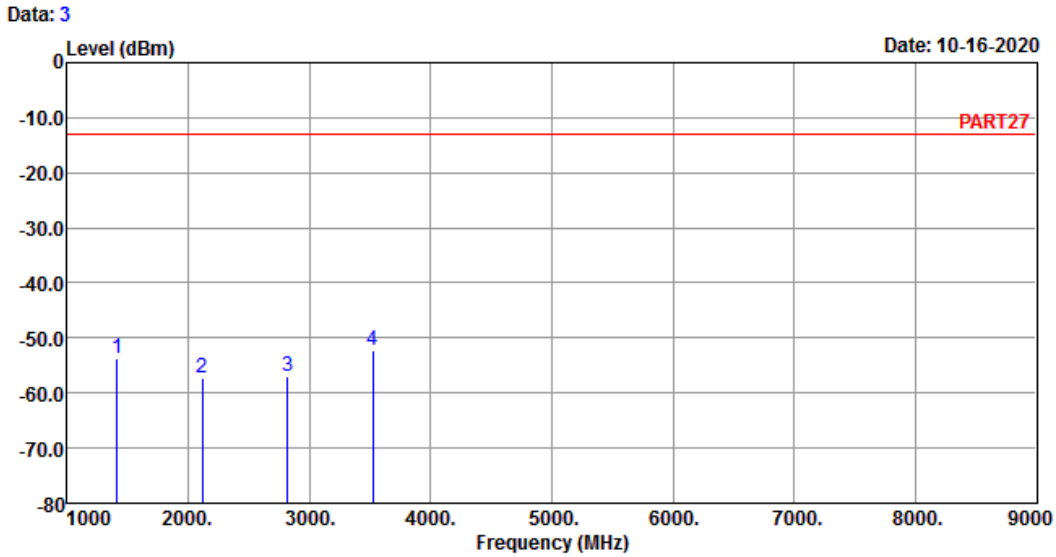
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1427.00	-47.42	-35.17	-13.00	-12.25	-34.42	Peak
2	2140.50	-53.06	-43.49	-13.00	-9.57	-40.06	Peak

Channel Bandwidth: 10 MHz / QPSK

Low Channel

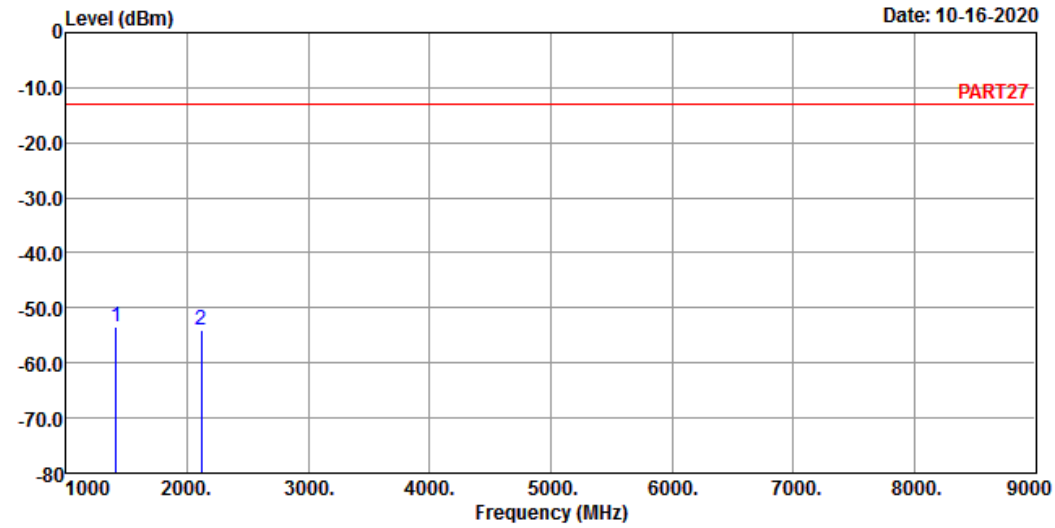
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1408.00	-53.84	-41.88	-13.00	-11.96	-40.84	Peak
2	2112.00	-57.34	-47.38	-13.00	-9.96	-44.34	Peak
3	2816.00	-57.08	-48.59	-13.00	-8.49	-44.08	Peak
4 pp	3520.00	-52.39	-45.01	-13.00	-7.38	-39.39	Peak

Data: 4

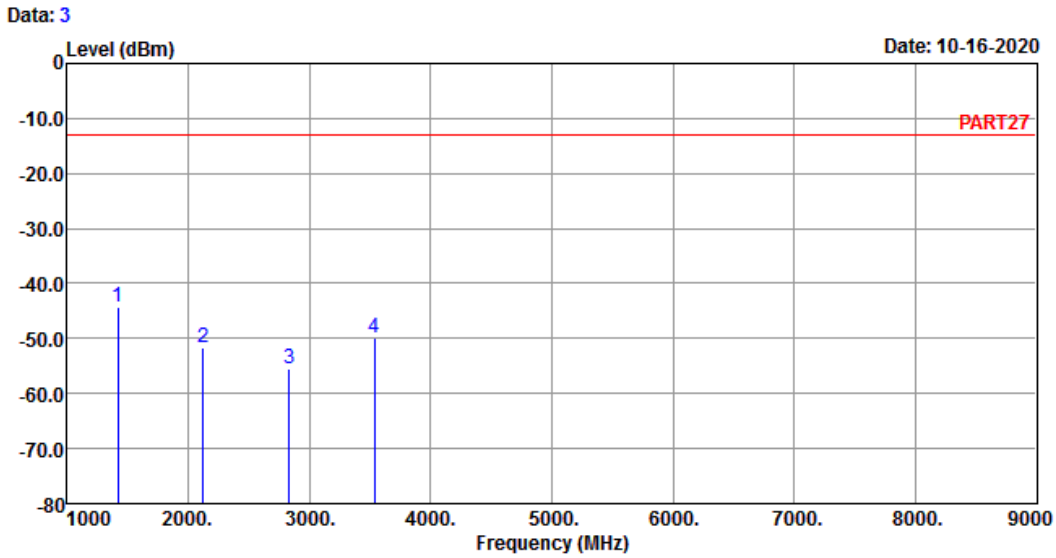


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1408.00	-53.41	-41.45	-13.00	-11.96	-40.41	Peak
2	2112.00	-53.95	-43.99	-13.00	-9.96	-40.95	Peak

Middle Channel

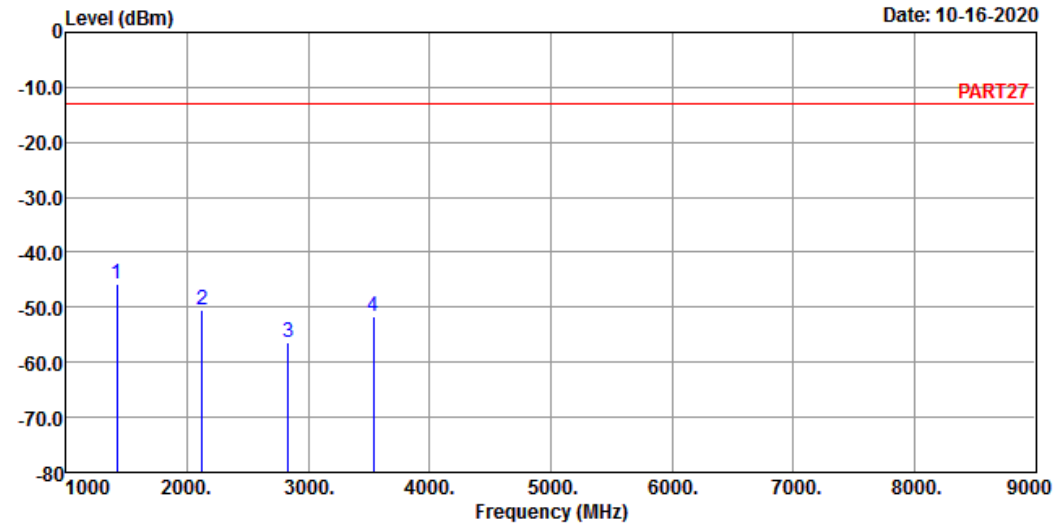
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-44.27	-32.19	-13.00	-12.08	-31.27	Peak
2	2122.50	-51.79	-41.92	-13.00	-9.87	-38.79	Peak
3	2830.00	-55.57	-47.09	-13.00	-8.48	-42.57	Peak
4	3537.50	-49.96	-42.74	-13.00	-7.22	-36.96	Peak

Data: 4

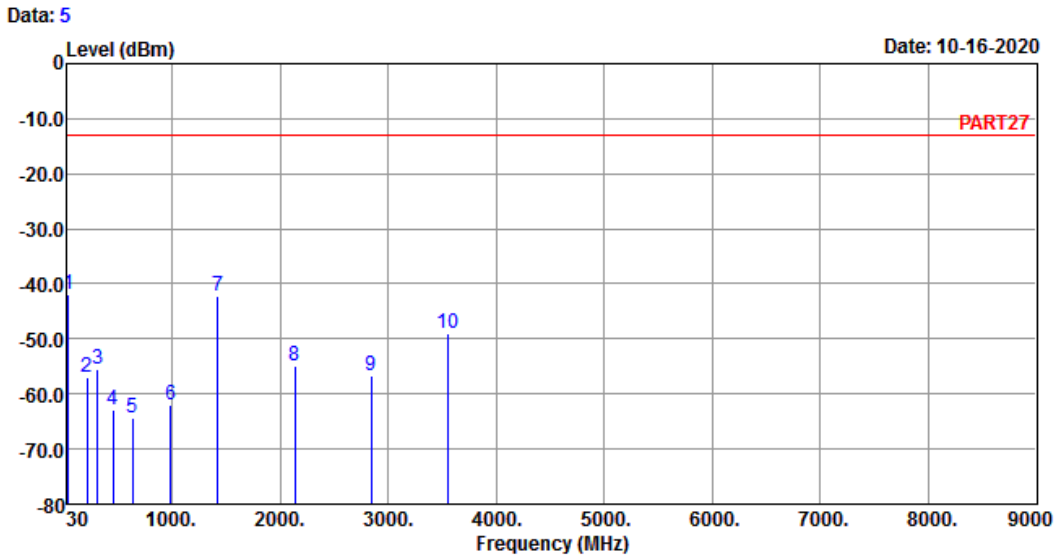


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-45.63	-33.55	-13.00	-12.08	-32.63	Peak
2	2120.00	-50.38	-40.51	-13.00	-9.87	-37.38	Peak
3	2830.00	-56.40	-47.92	-13.00	-8.48	-43.40	Peak
4	3537.50	-51.76	-44.54	-13.00	-7.22	-38.76	Peak

High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

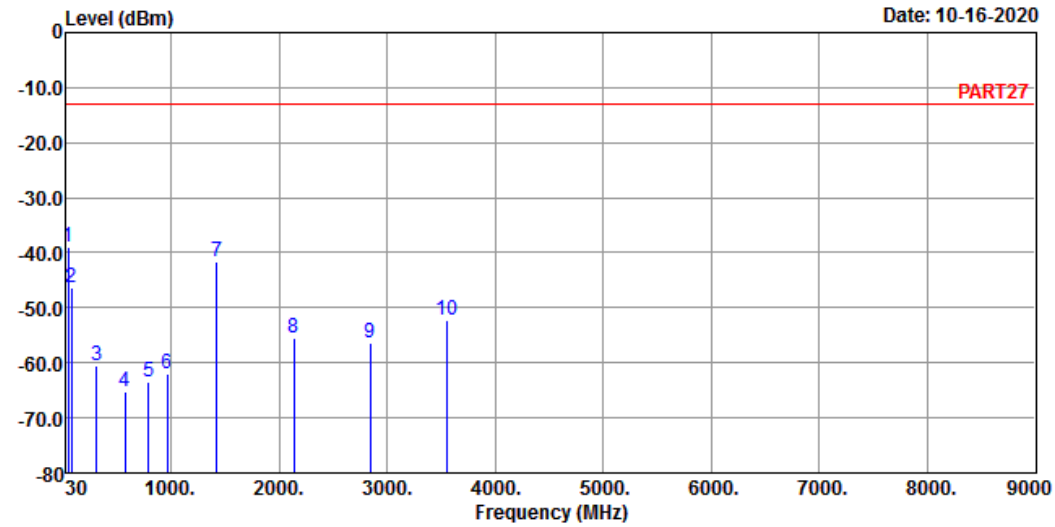


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	42.61	-41.94	-41.00	-13.00	-0.94	-28.94	Peak
2	210.42	-57.02	-49.43	-13.00	-7.59	-44.02	Peak
3	307.42	-55.47	-48.58	-13.00	-6.89	-42.47	Peak
4	451.95	-62.78	-57.27	-13.00	-5.51	-49.78	Peak
5	633.34	-64.27	-63.43	-13.00	-0.84	-51.27	Peak
6	986.42	-62.03	-65.13	-13.00	3.10	-49.03	Peak
7	1422.00	-42.32	-30.13	-13.00	-12.19	-29.32	Peak
8	2133.00	-55.04	-45.37	-13.00	-9.67	-42.04	Peak
9	2844.00	-56.69	-48.23	-13.00	-8.46	-43.69	Peak
10	3555.00	-48.97	-41.82	-13.00	-7.15	-35.97	Peak

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

Data: 6



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M Link_H-CH
Tested by: Cyril Chen

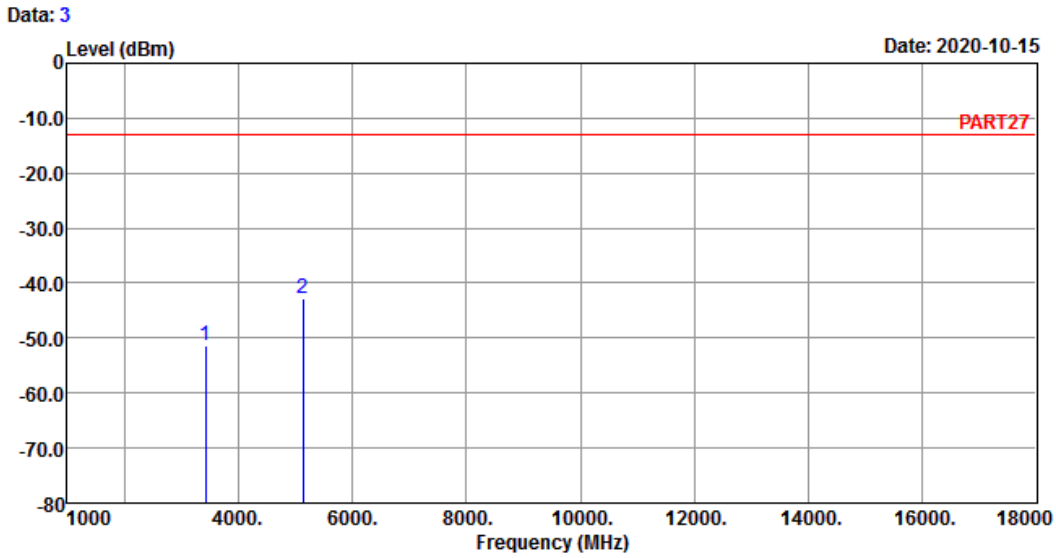
	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	43.58	-39.01	-37.54	-13.00	-1.47	-26.01	Peak
2	76.56	-46.27	-36.29	-13.00	-9.98	-33.27	Peak
3	307.42	-60.60	-53.71	-13.00	-6.89	-47.60	Peak
4	575.14	-65.27	-63.47	-13.00	-1.80	-52.27	Peak
5	788.54	-63.60	-64.37	-13.00	0.77	-50.60	Peak
6	965.08	-62.11	-64.46	-13.00	2.35	-49.11	Peak
7	1422.00	-41.55	-29.36	-13.00	-12.19	-28.55	Peak
8	2133.00	-55.44	-45.77	-13.00	-9.67	-42.44	Peak
9	2844.00	-56.50	-48.04	-13.00	-8.46	-43.50	Peak
10	3555.00	-52.34	-45.19	-13.00	-7.15	-39.34	Peak

Mode B

WCDMA:

Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

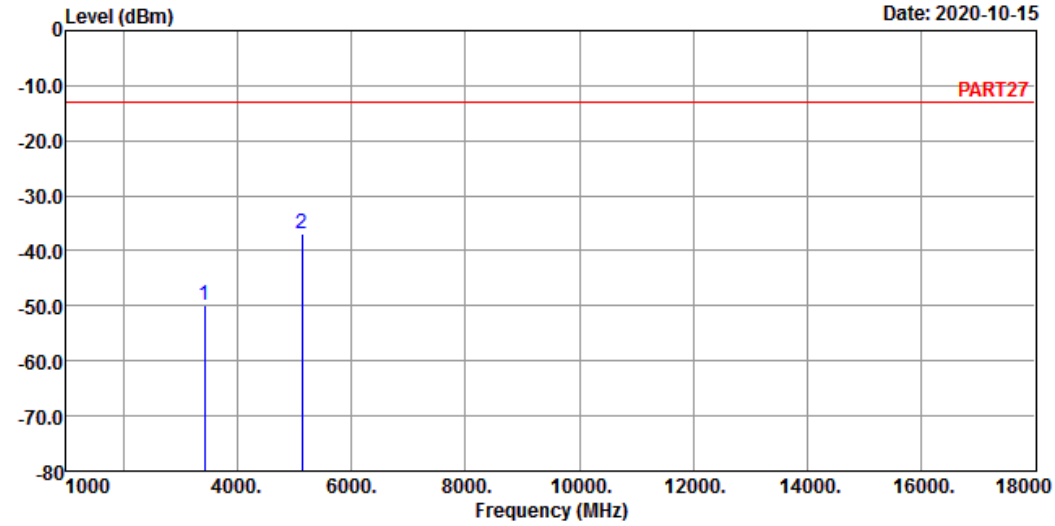


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : WCDMA Band 4 Link_L-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3424.80	-51.30	-42.96	-13.00	-8.34	-38.30	Peak
2 pp	5137.20	-42.71	-40.97	-13.00	-1.74	-29.71	Peak

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

Data: 4

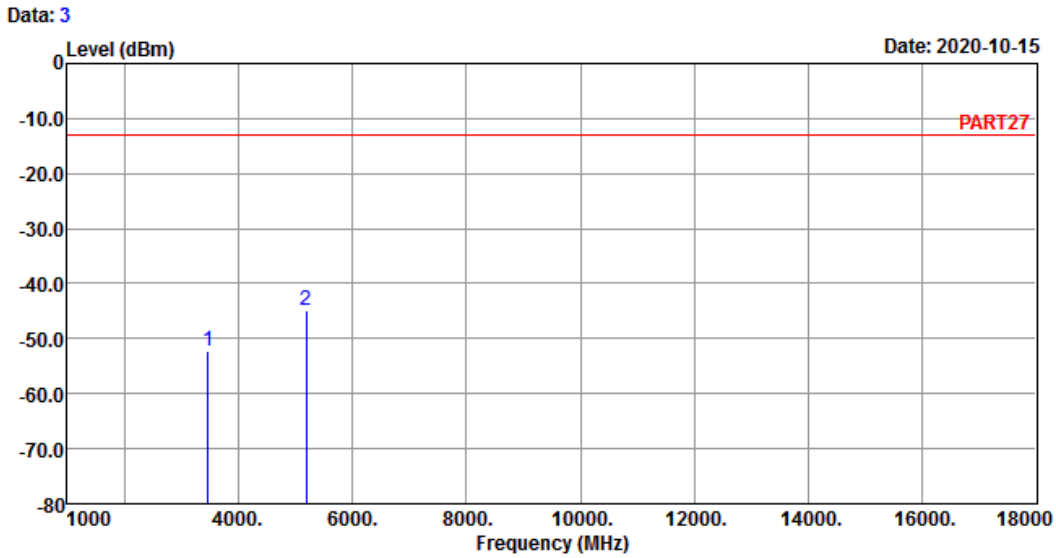


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : WCDMA Band 4 Link_L-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3424.80	-49.81	-41.47	-13.00	-8.34	-36.81	Peak
2 pp	5137.20	-37.02	-35.28	-13.00	-1.74	-24.02	Peak

Middle Channel

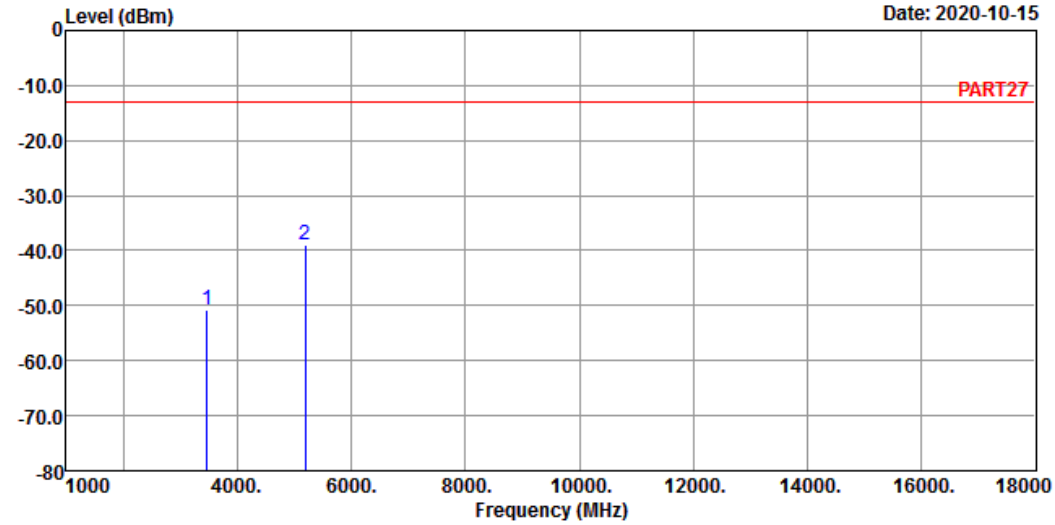
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : WCDMA Band 4 Link_M-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.20	-52.30	-44.42	-13.00	-7.88	-39.30	Peak
2 pp	5197.80	-44.87	-42.80	-13.00	-2.07	-31.87	Peak

Data: 4

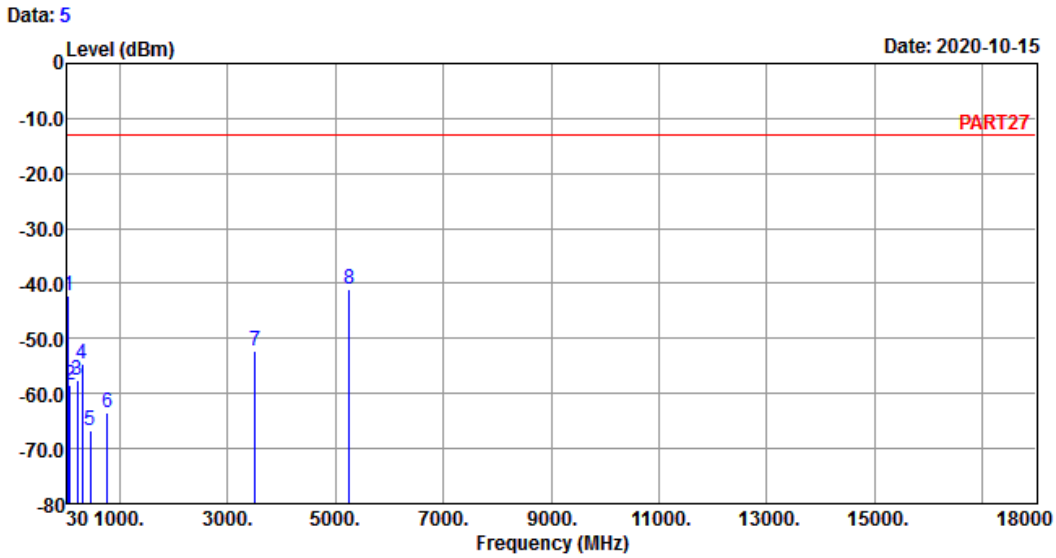


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : WCDMA Band 4 Link_M-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.20	-50.63	-42.75	-13.00	-7.88	-37.63	Peak
2 pp	5197.80	-38.82	-36.75	-13.00	-2.07	-25.82	Peak

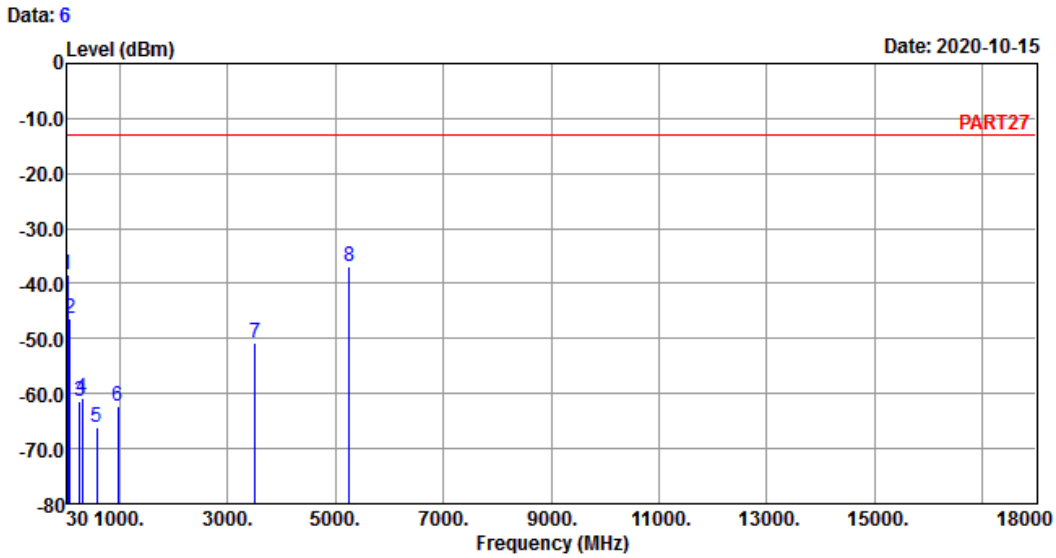
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : WCDMA Band 4 Link_H-CH
Tested by: tim-chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	42.61	-42.28	-41.34	-13.00	-0.94	-29.28	Peak
2	80.44	-58.40	-47.52	-13.00	-10.88	-45.40	Peak
3	211.39	-57.68	-50.13	-13.00	-7.55	-44.68	Peak
4	308.39	-54.51	-47.63	-13.00	-6.88	-41.51	Peak
5	457.77	-66.76	-61.35	-13.00	-5.41	-53.76	Peak
6	778.84	-63.55	-64.35	-13.00	0.80	-50.55	Peak
7	3505.20	-52.20	-44.75	-13.00	-7.45	-39.20	Peak
8 pp	5257.80	-41.11	-38.59	-13.00	-2.52	-28.11	Peak



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : WCDMA Band 4 Link_H-CH
Tested by: tim-chen

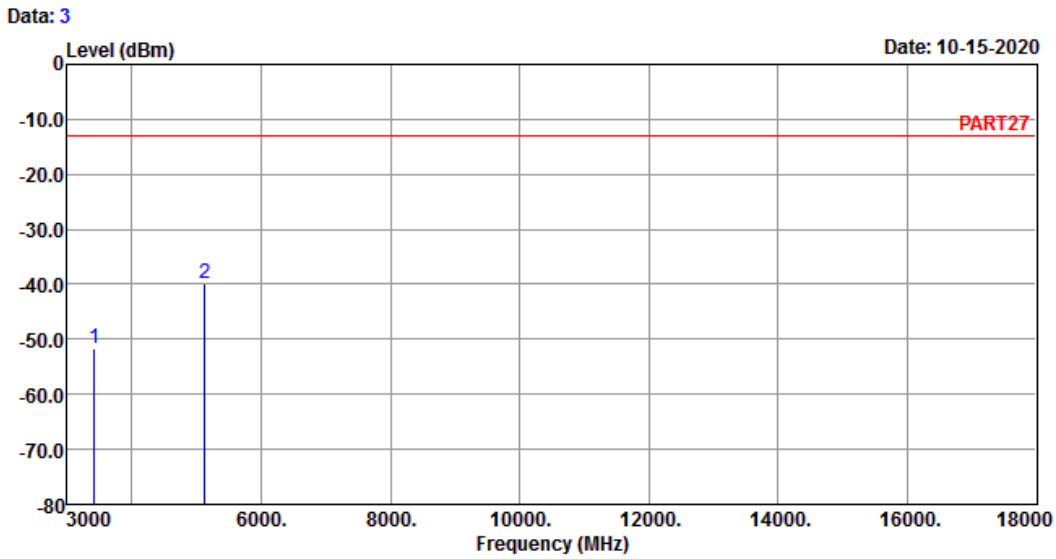
	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	41.64	-38.48	-38.07	-13.00	-0.41	-25.48	Peak
2	76.56	-46.29	-36.31	-13.00	-9.98	-33.29	Peak
3	259.89	-61.30	-55.11	-13.00	-6.19	-48.30	Peak
4	309.36	-60.87	-54.01	-13.00	-6.86	-47.87	Peak
5	576.11	-66.24	-64.48	-13.00	-1.76	-53.24	Peak
6	969.93	-62.31	-64.83	-13.00	2.52	-49.31	Peak
7	3505.20	-50.78	-43.33	-13.00	-7.45	-37.78	Peak
8 pp	5257.80	-36.85	-34.33	-13.00	-2.52	-23.85	Peak

LTE Band 4

Channel Bandwidth: 1.4 MHz / QPSK

Low Channel

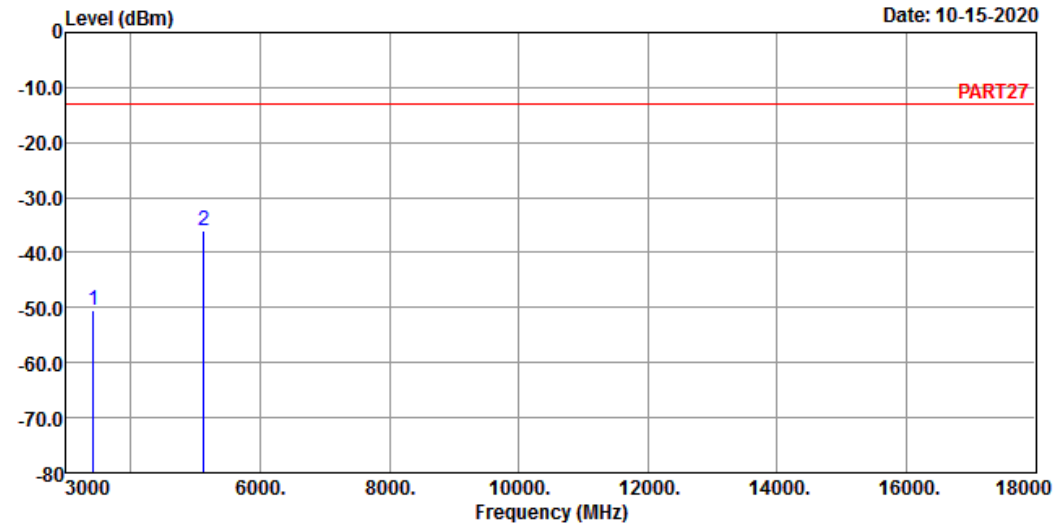
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3421.40	-51.68	-43.34	-13.00	-8.34	-38.68	Peak
2 pp	5132.10	-39.80	-38.06	-13.00	-1.74	-26.80	Peak

Data: 4

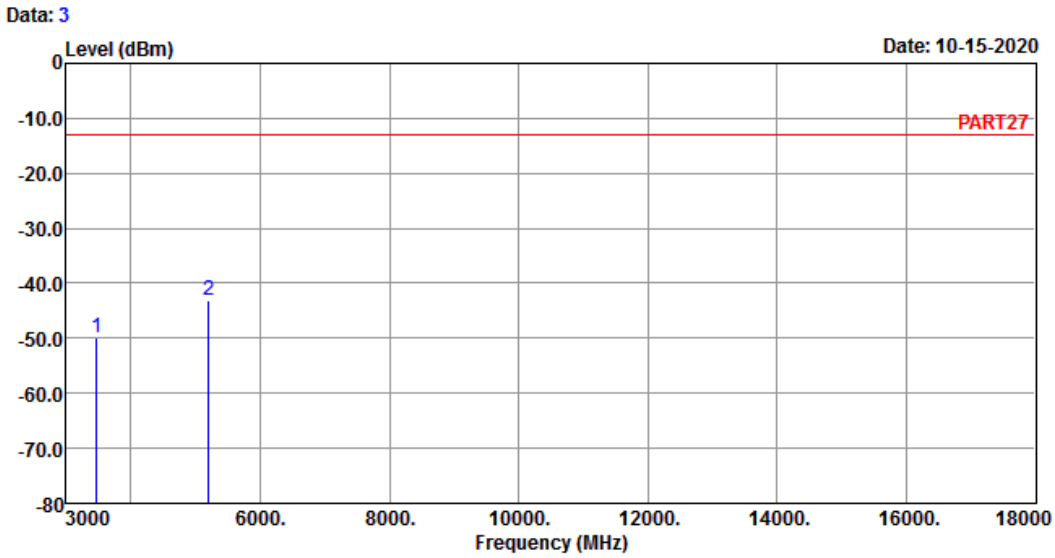


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3421.40	-50.60	-42.26	-13.00	-8.34	-37.60	Peak
2 pp	5132.10	-36.12	-34.38	-13.00	-1.74	-23.12	Peak

Middle Channel

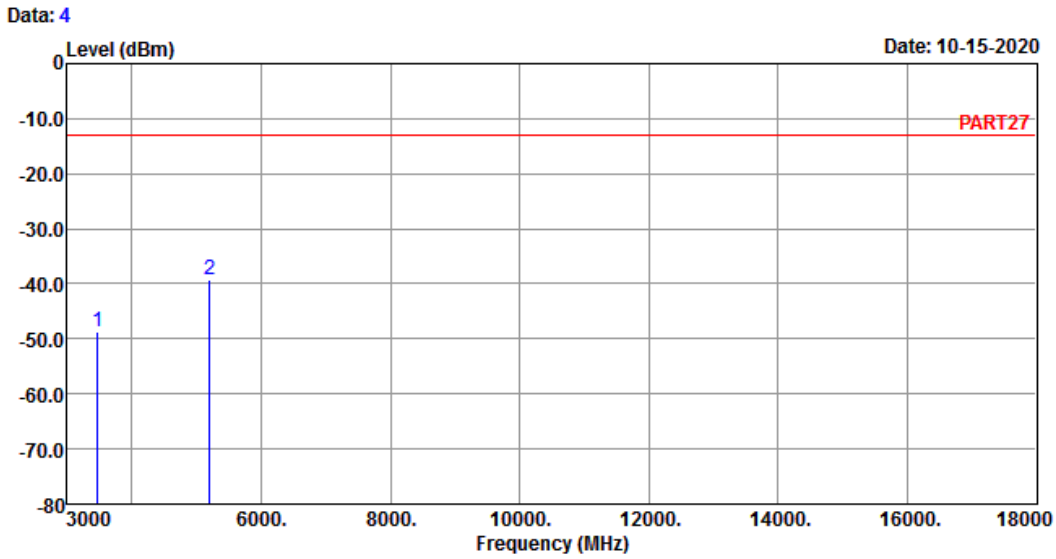
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-49.94	-42.06	-13.00	-7.88	-36.94	Peak
2 pp	5197.50	-43.22	-41.15	-13.00	-2.07	-30.22	Peak

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

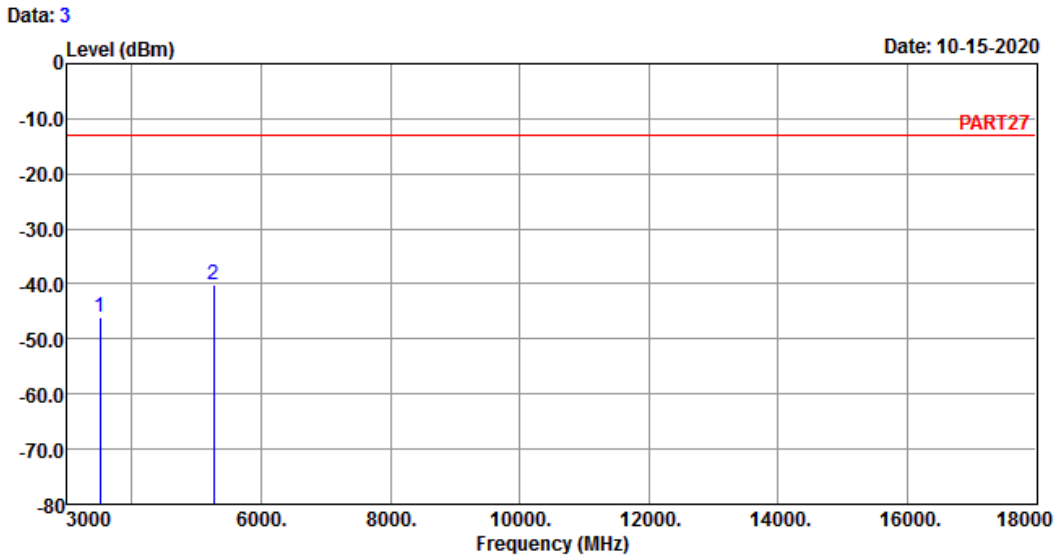


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-48.83	-40.95	-13.00	-7.88	-35.83	Peak
2 pp	5197.50	-39.21	-37.14	-13.00	-2.07	-26.21	Peak

High Channel

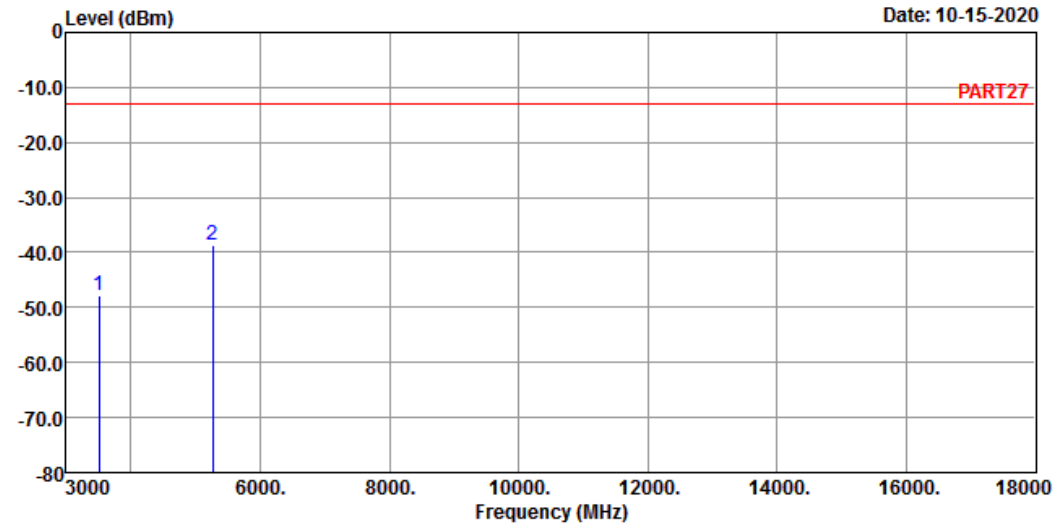
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3508.60	-45.97	-38.52	-13.00	-7.45	-32.97	Peak
2 pp	5262.90	-40.11	-37.59	-13.00	-2.52	-27.11	Peak

Data: 4



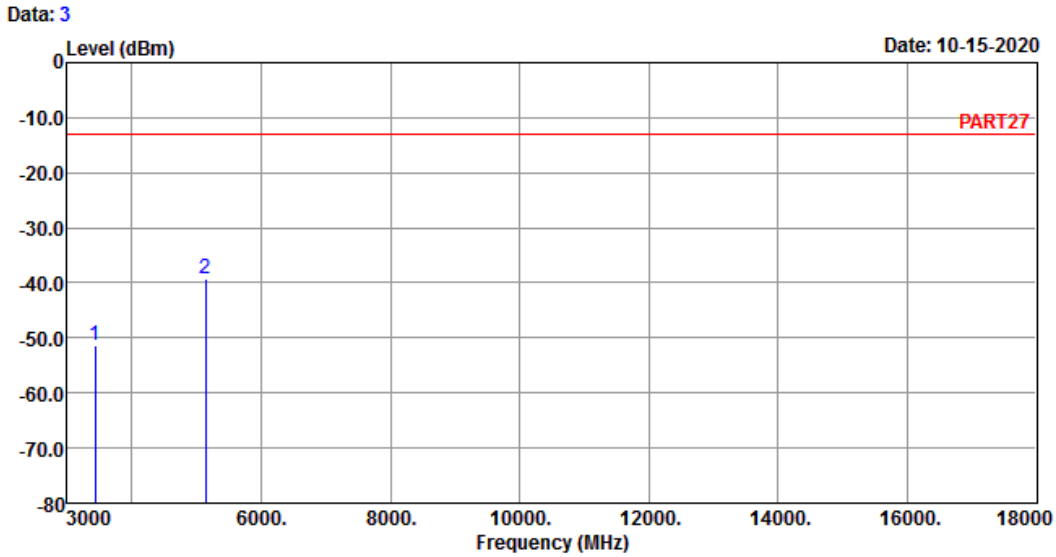
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3508.60	-47.79	-40.34	-13.00	-7.45	-34.79	Peak
2 pp	5262.90	-38.70	-36.18	-13.00	-2.52	-25.70	Peak

Channel Bandwidth: 5 MHz / QPSK

Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

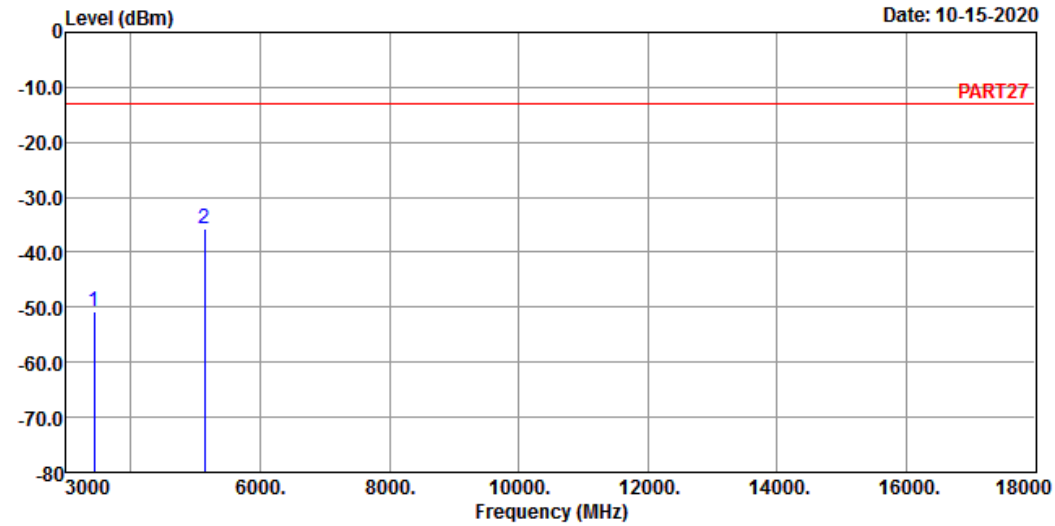


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3425.00	-51.49	-43.15	-13.00	-8.34	-38.49	Peak
2 pp	5137.50	-39.35	-37.61	-13.00	-1.74	-26.35	Peak

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

Data: 4

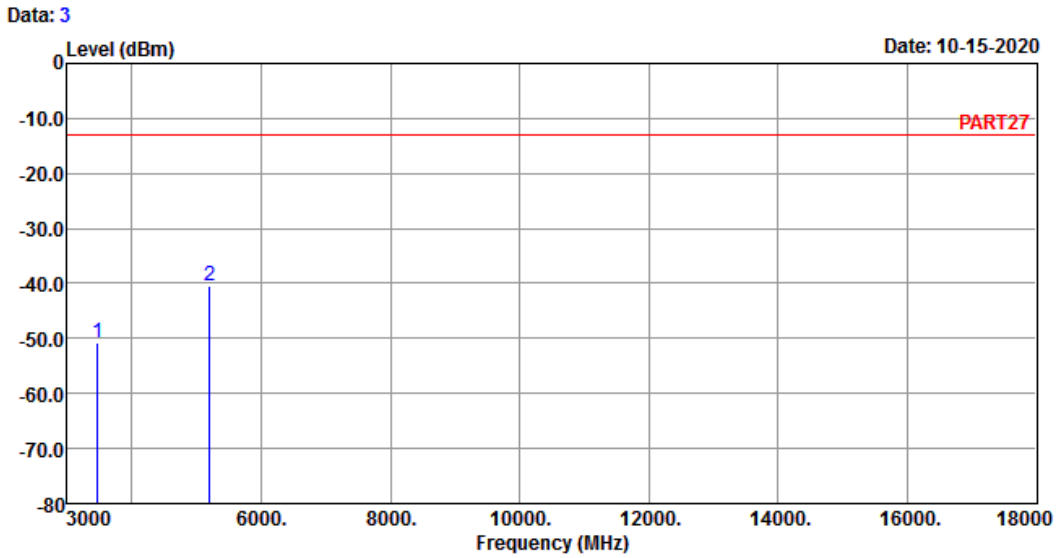


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3425.00	-50.78	-42.44	-13.00	-8.34	-37.78	Peak
2 pp	5137.50	-35.76	-34.02	-13.00	-1.74	-22.76	Peak

Middle Channel

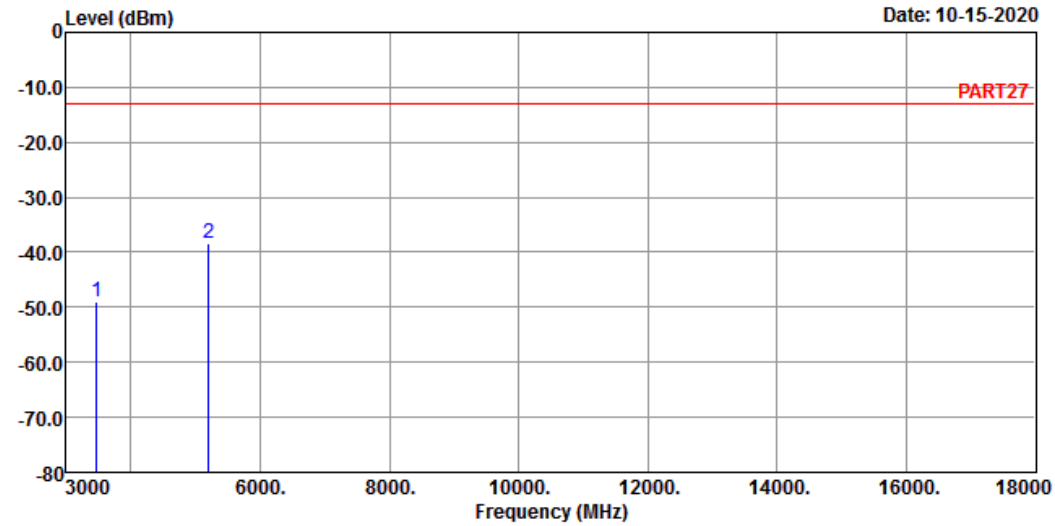
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-50.69	-42.81	-13.00	-7.88	-37.69	Peak
2 pp	5197.50	-40.32	-38.25	-13.00	-2.07	-27.32	Peak

Data: 4

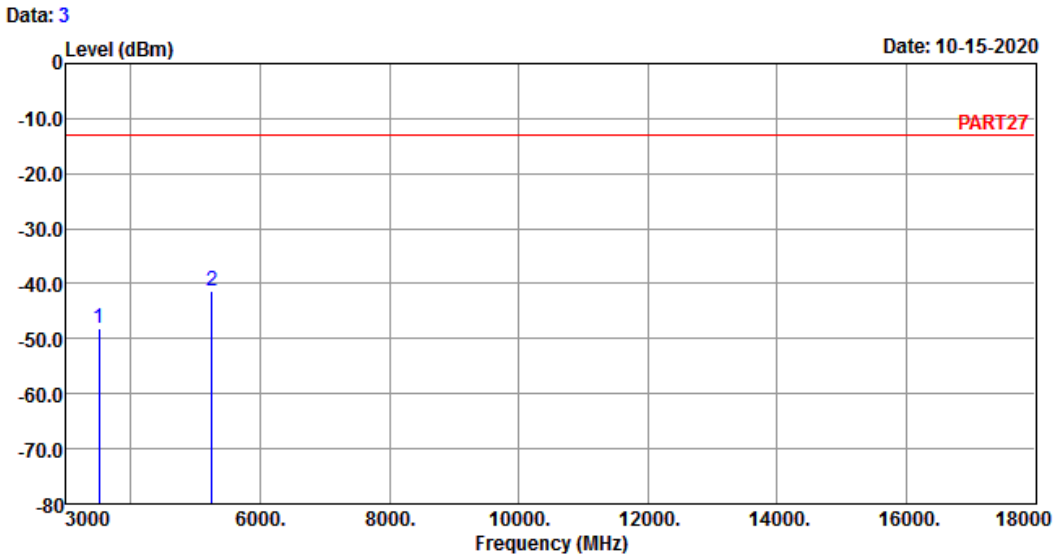


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-49.00	-41.12	-13.00	-7.88	-36.00	Peak
2 pp	5197.50	-38.49	-36.42	-13.00	-2.07	-25.49	Peak

High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

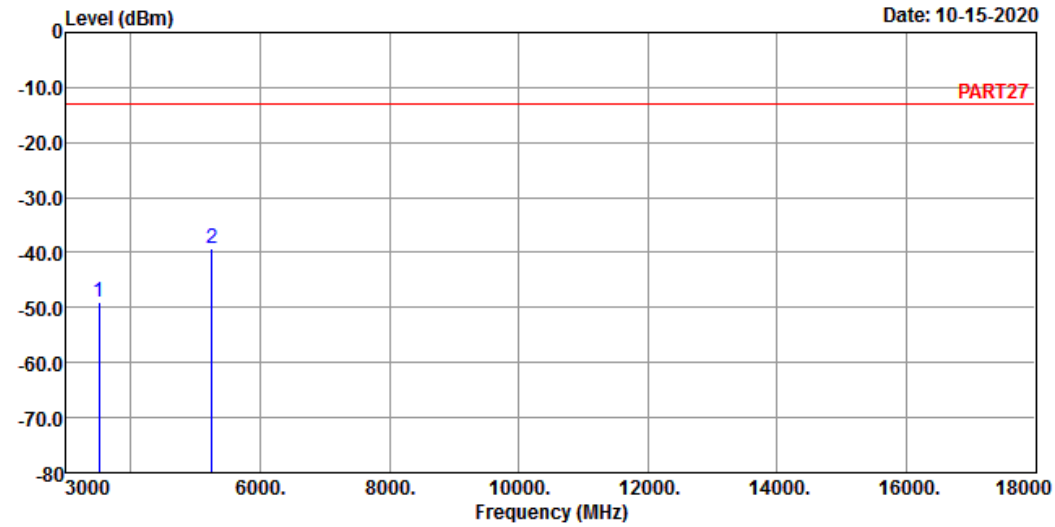


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3505.00	-48.17	-40.72	-13.00	-7.45	-35.17	Peak
2 pp	5257.50	-41.47	-38.95	-13.00	-2.52	-28.47	Peak

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

Data: 4



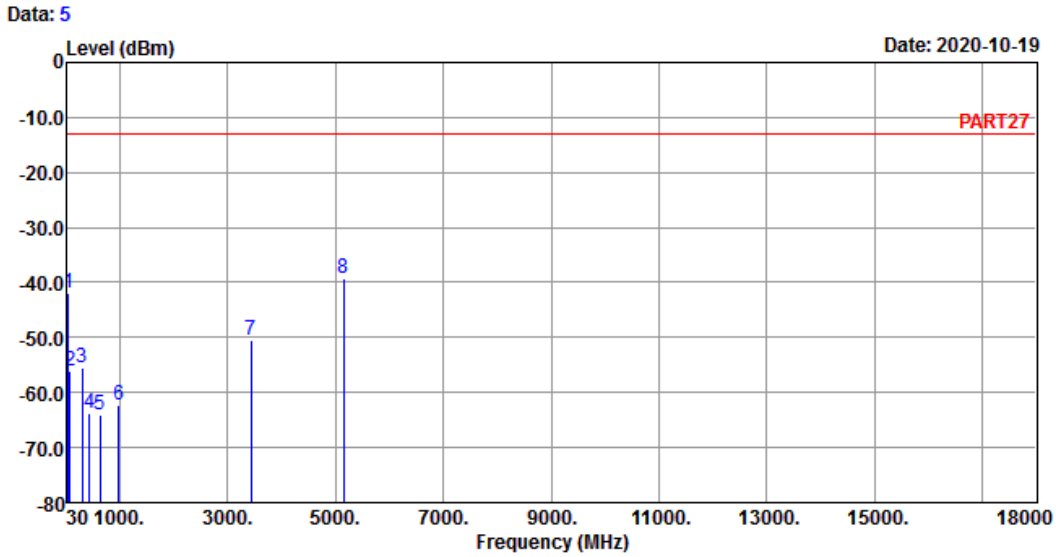
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3505.00	-49.03	-41.58	-13.00	-7.45	-36.03	Peak
2 pp	5257.50	-39.18	-36.66	-13.00	-2.52	-26.18	Peak

Channel Bandwidth: 20 MHz / QPSK

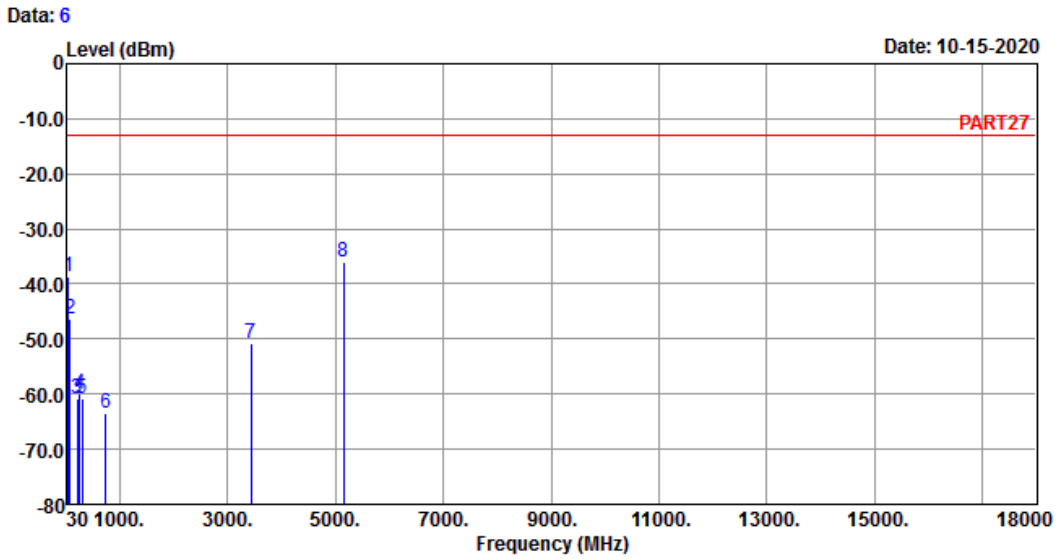
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	42.61	-41.95	-41.01	-13.00	-0.94	-28.95	Peak
2	77.53	-56.15	-45.95	-13.00	-10.20	-43.15	Peak
3	309.36	-55.45	-48.59	-13.00	-6.86	-42.45	Peak
4	448.07	-63.76	-58.19	-13.00	-5.57	-50.76	Peak
5	641.10	-64.16	-63.30	-13.00	-0.86	-51.16	Peak
6	975.75	-62.15	-64.87	-13.00	2.72	-49.15	Peak
7	3440.00	-50.53	-42.31	-13.00	-8.22	-37.53	Peak
8 pp	5160.00	-39.39	-37.48	-13.00	-1.91	-26.39	Peak

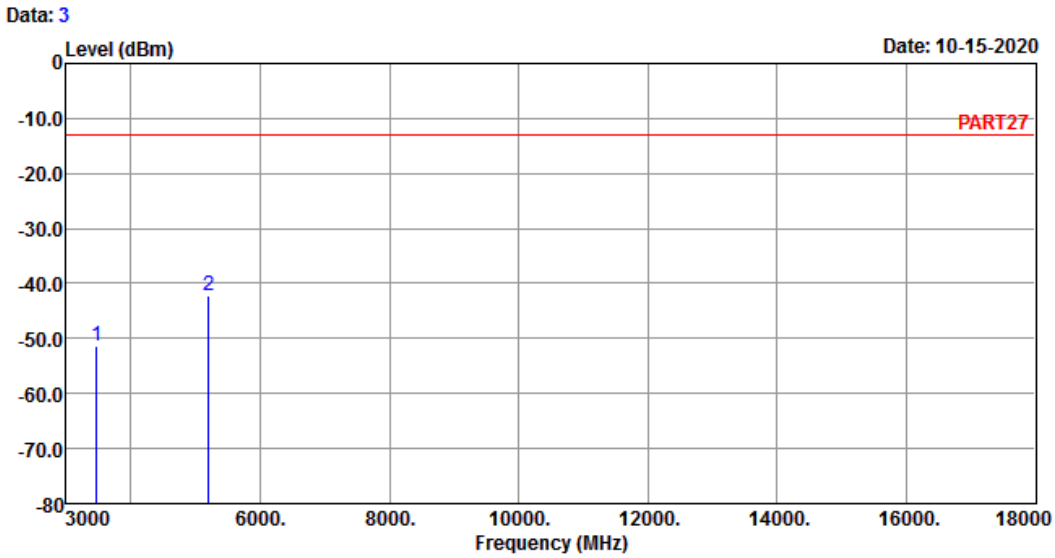


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	42.61	-38.80	-37.86	-13.00	-0.94	-25.80	Peak
2	76.56	-46.26	-36.28	-13.00	-9.98	-33.26	Peak
3	220.12	-60.88	-53.68	-13.00	-7.20	-47.88	Peak
4	259.89	-60.05	-53.86	-13.00	-6.19	-47.05	Peak
5	309.36	-60.87	-54.01	-13.00	-6.86	-47.87	Peak
6	736.16	-63.60	-64.21	-13.00	0.61	-50.60	Peak
7	3440.00	-50.78	-42.56	-13.00	-8.22	-37.78	Peak
8 pp	5160.00	-35.99	-34.08	-13.00	-1.91	-22.99	Peak

Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

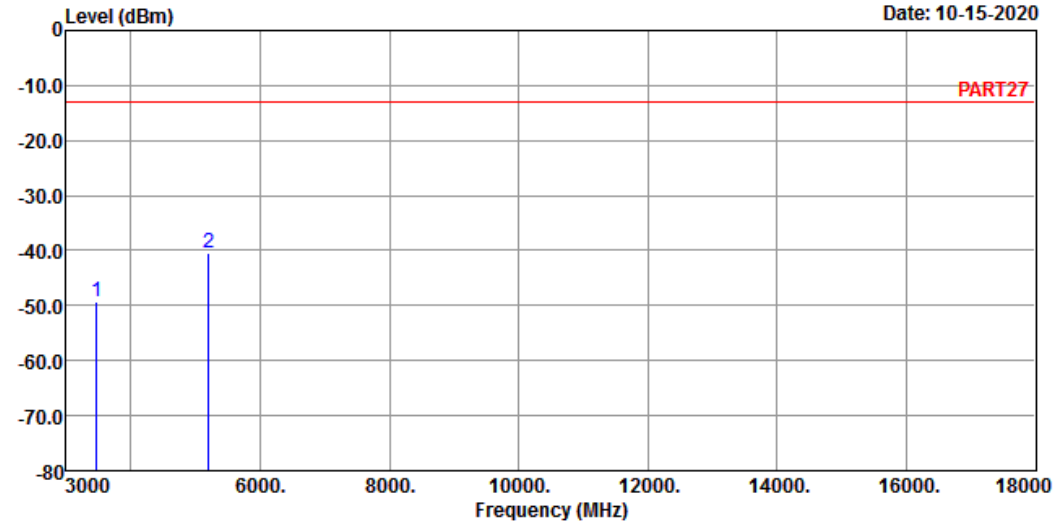


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-51.49	-43.61	-13.00	-7.88	-38.49	Peak
2 pp	5197.50	-42.23	-40.16	-13.00	-2.07	-29.23	Peak

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

Data: 4

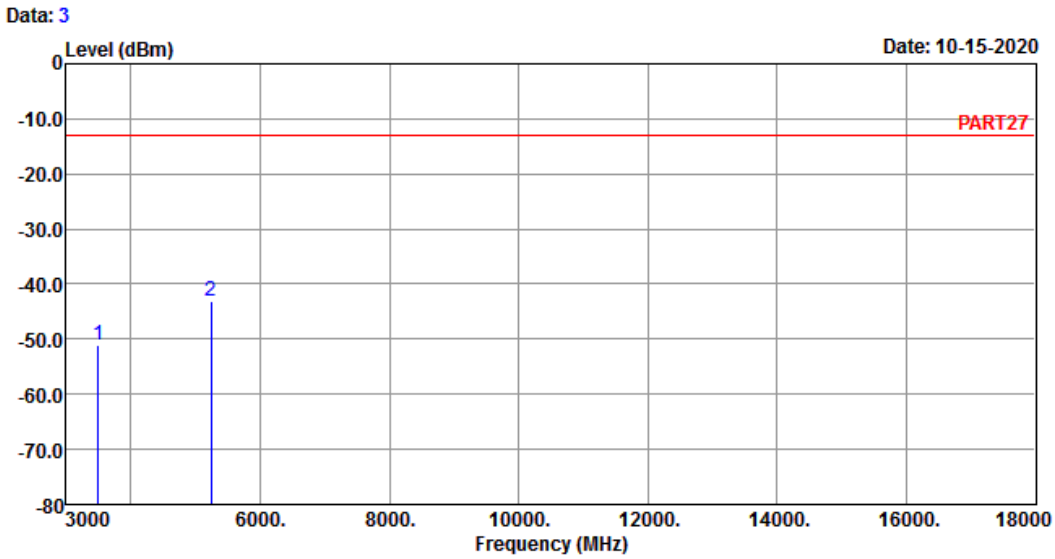


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3465.00	-49.39	-41.51	-13.00	-7.88	-36.39	Peak
2 pp	5197.50	-40.31	-38.24	-13.00	-2.07	-27.31	Peak

High Channel

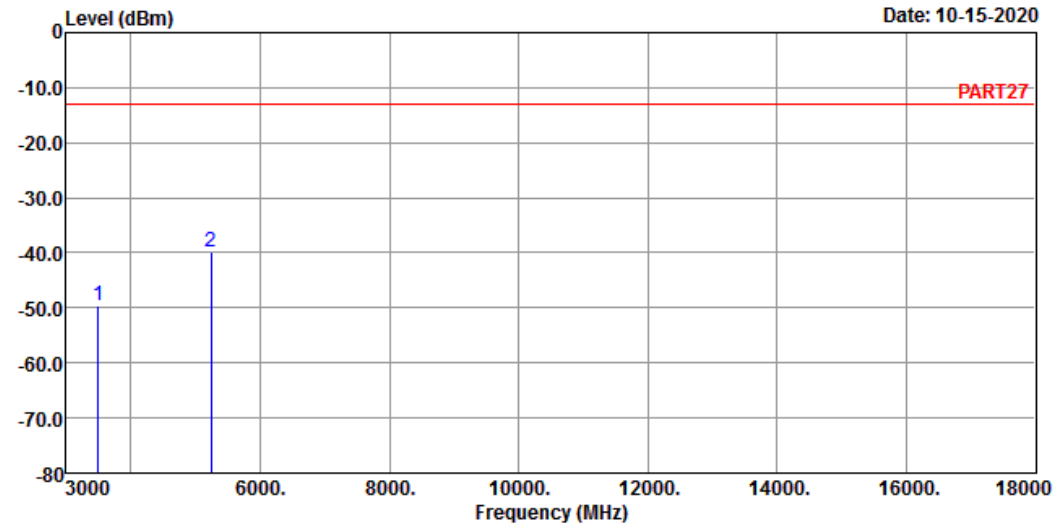
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 4 QPSK_20M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3490.00	-51.02	-43.37	-13.00	-7.65	-38.02	Peak
2 pp	5235.00	-43.05	-40.64	-13.00	-2.41	-30.05	Peak

Data: 4



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 4 QPSK_20M Link_H-CH
Tested by: Cyril Chen

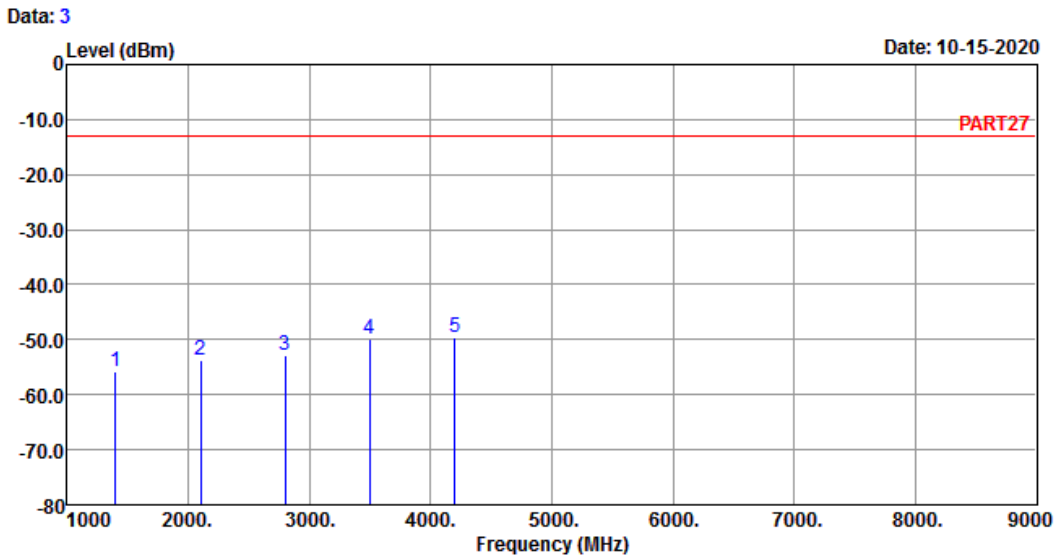
	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	3490.00	-49.53	-41.88	-13.00	-7.65	-36.53	Peak
2 pp	5235.00	-39.88	-37.47	-13.00	-2.41	-26.88	Peak

LTE Band 12

Channel Bandwidth: 1.4 MHz / QPSK

Low Channel

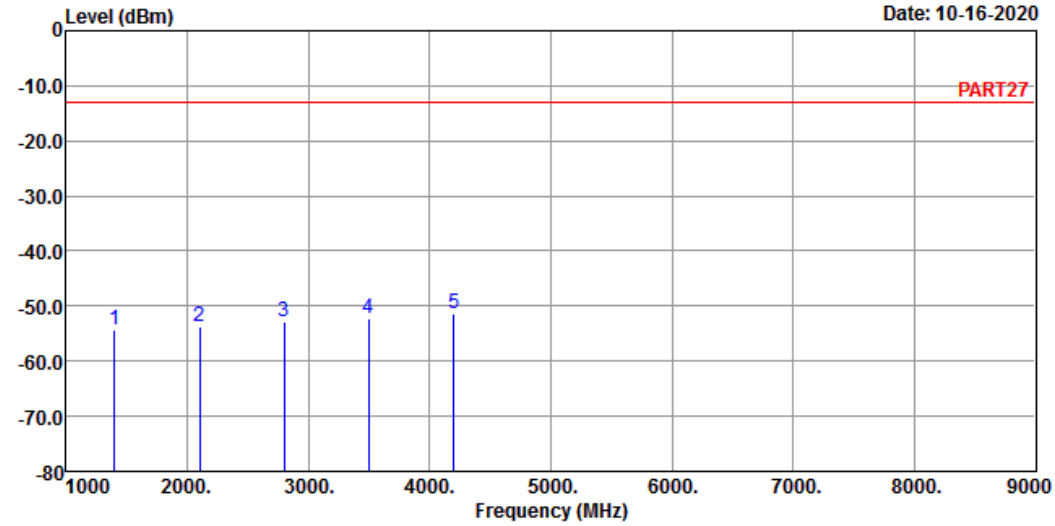
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1399.40	-55.90	-44.05	-13.00	-11.85	-42.90	Peak
2	2099.10	-53.60	-43.44	-13.00	-10.16	-40.60	Peak
3	2798.80	-52.88	-44.36	-13.00	-8.52	-39.88	Peak
4	3498.50	-49.89	-42.36	-13.00	-7.53	-36.89	Peak
5 pp	4198.20	-49.62	-44.02	-13.00	-5.60	-36.62	Peak

Data: 4

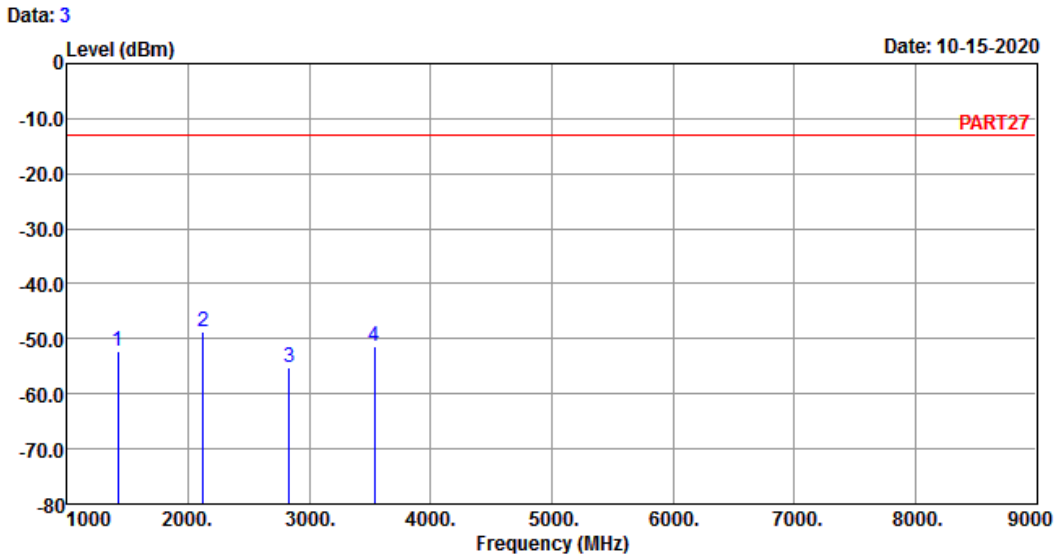


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_1.4M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1399.40	-54.20	-42.35	-13.00	-11.85	-41.20	Peak
2	2099.10	-53.85	-43.69	-13.00	-10.16	-40.85	Peak
3	2798.80	-52.88	-44.36	-13.00	-8.52	-39.88	Peak
4	3498.50	-52.30	-44.77	-13.00	-7.53	-39.30	Peak
5 pp	4198.20	-51.45	-45.85	-13.00	-5.60	-38.45	Peak

Middle Channel

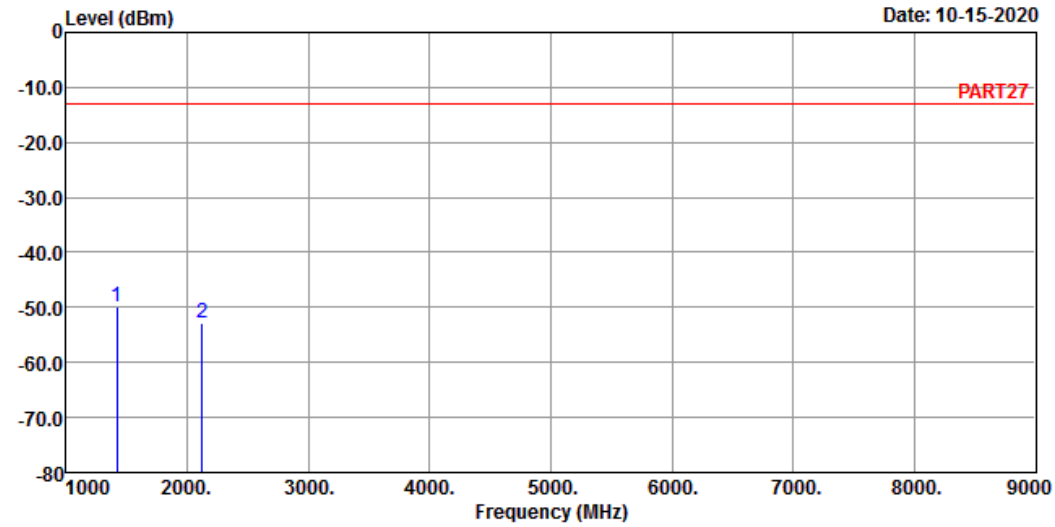
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1415.00	-52.17	-40.09	-13.00	-12.08	-39.17	Peak
2 pp	2122.50	-48.69	-38.82	-13.00	-9.87	-35.69	Peak
3	2830.00	-55.07	-46.59	-13.00	-8.48	-42.07	Peak
4	3537.50	-51.31	-44.09	-13.00	-7.22	-38.31	Peak

Data: 4

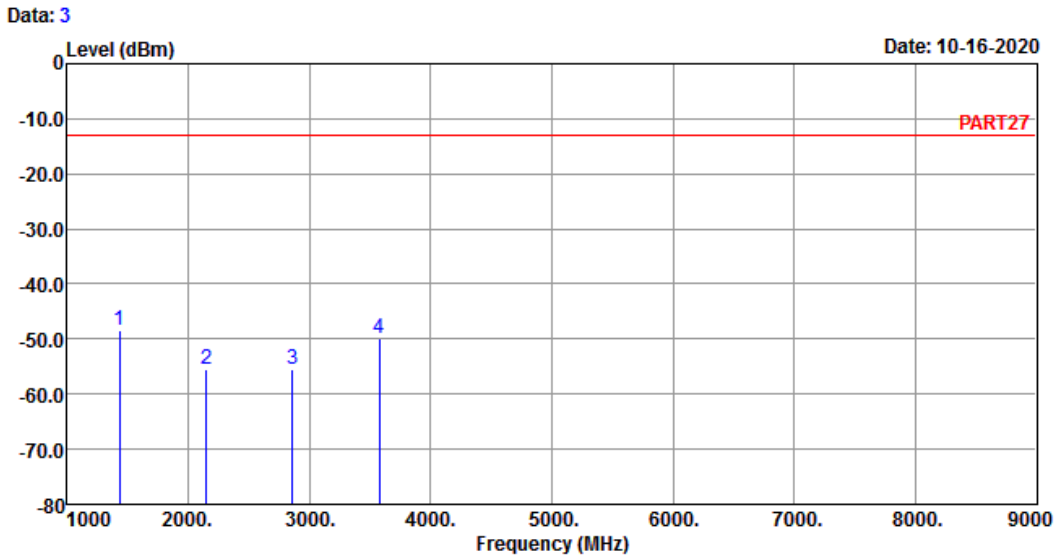


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_1.4M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-50.00	-37.92	-13.00	-12.08	-37.00	Peak
2	2122.50	-52.70	-42.83	-13.00	-9.87	-39.70	Peak

High Channel

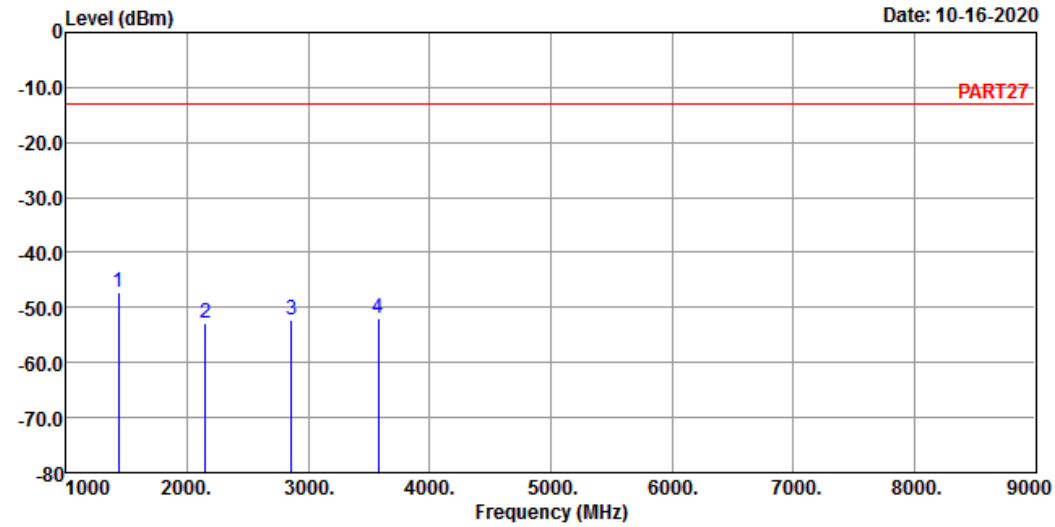
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1430.60	-48.48	-36.17	-13.00	-12.31	-35.48	Peak
2	2145.90	-55.59	-46.12	-13.00	-9.47	-42.59	Peak
3	2861.20	-55.53	-47.10	-13.00	-8.43	-42.53	Peak
4	3576.50	-49.75	-42.76	-13.00	-6.99	-36.75	Peak

Data: 4



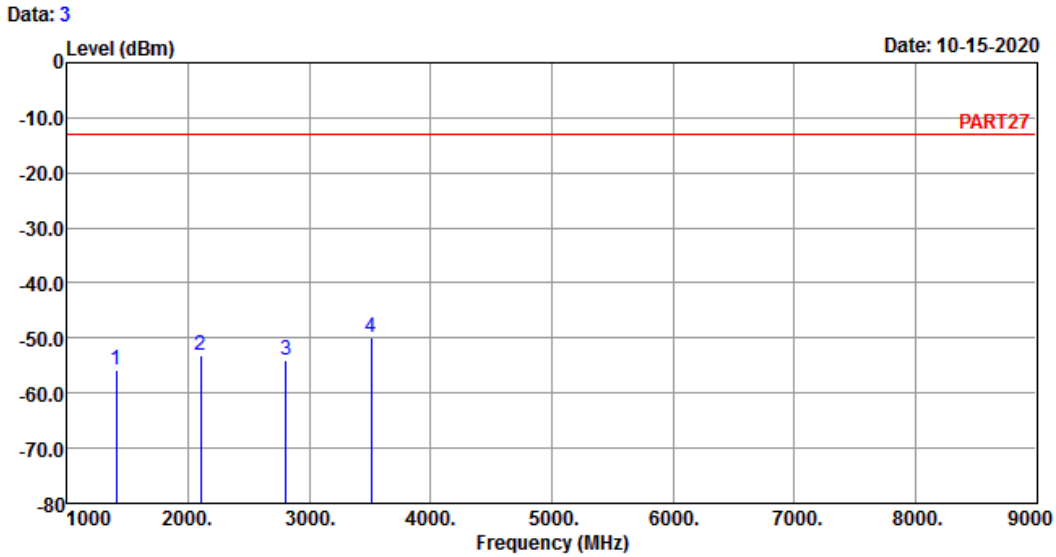
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_1.4M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1430.60	-47.35	-35.04	-13.00	-12.31	-34.35	Peak
2	2145.90	-52.82	-43.35	-13.00	-9.47	-39.82	Peak
3	2861.20	-52.24	-43.81	-13.00	-8.43	-39.24	Peak
4	3576.50	-51.88	-44.89	-13.00	-6.99	-38.88	Peak

Channel Bandwidth: 5 MHz / QPSK

Low Channel

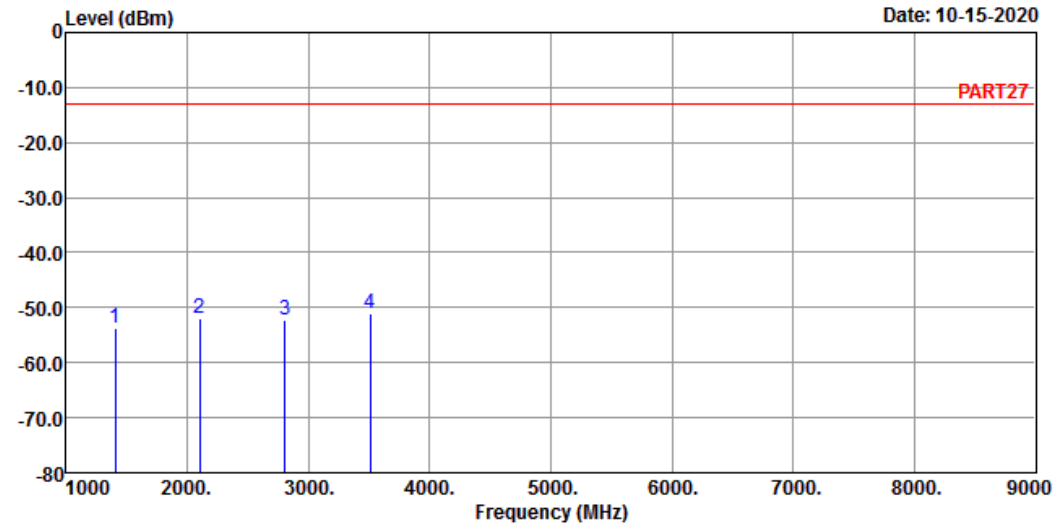
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1403.00	-55.85	-43.94	-13.00	-11.91	-42.85	Peak
2	2104.50	-53.06	-42.90	-13.00	-10.16	-40.06	Peak
3	2806.00	-54.09	-45.57	-13.00	-8.52	-41.09	Peak
4 pp	3507.50	-49.88	-42.43	-13.00	-7.45	-36.88	Peak

Data: 4

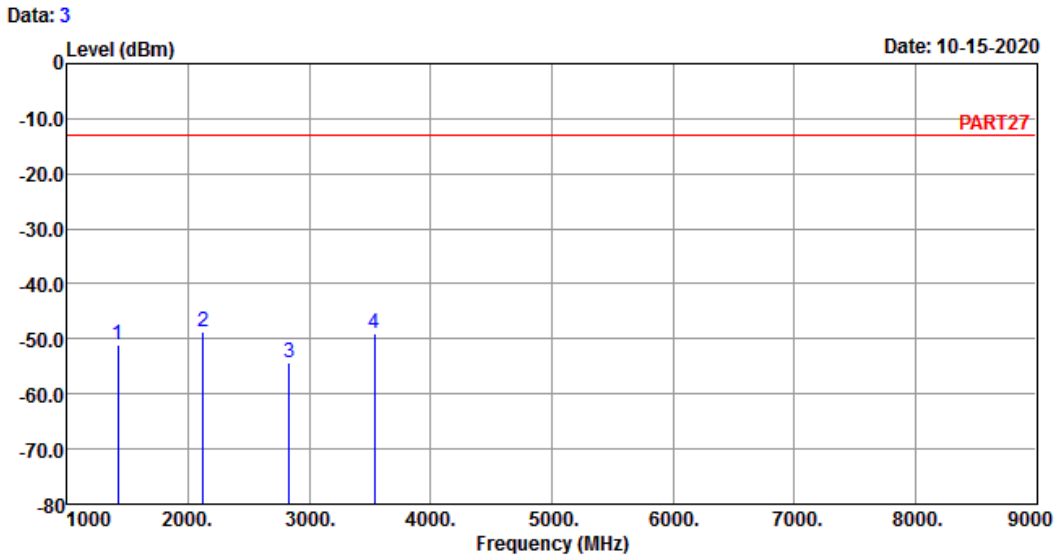


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_5M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1403.00	-53.78	-41.87	-13.00	-11.91	-40.78	Peak
2	2104.50	-51.88	-41.72	-13.00	-10.16	-38.88	Peak
3	2806.00	-52.39	-43.87	-13.00	-8.52	-39.39	Peak
4 pp	3507.50	-51.17	-43.72	-13.00	-7.45	-38.17	Peak

Middle Channel

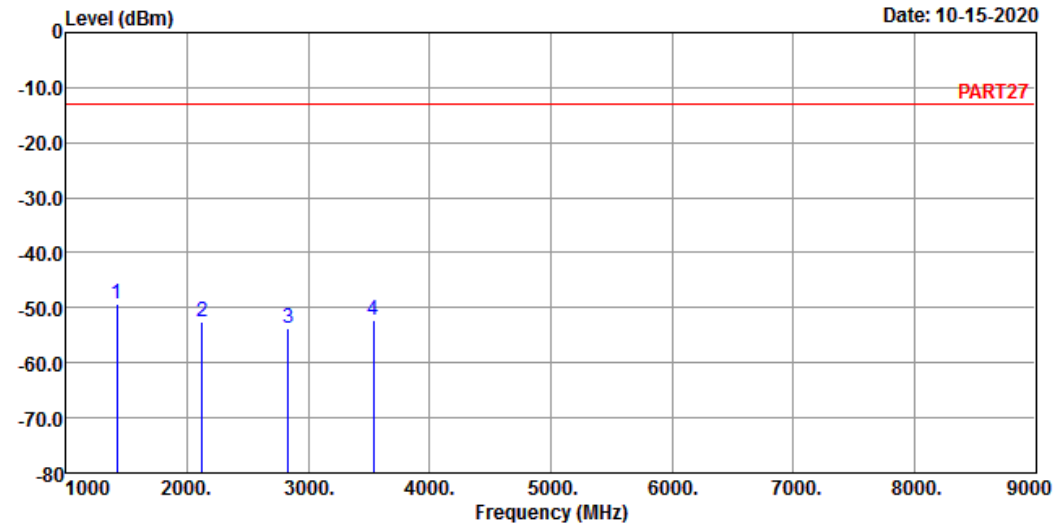
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1415.00	-51.04	-38.96	-13.00	-12.08	-38.04	Peak
2 pp	2122.50	-48.74	-38.87	-13.00	-9.87	-35.74	Peak
3	2830.00	-54.33	-45.85	-13.00	-8.48	-41.33	Peak
4	3537.50	-49.05	-41.83	-13.00	-7.22	-36.05	Peak

Data: 4

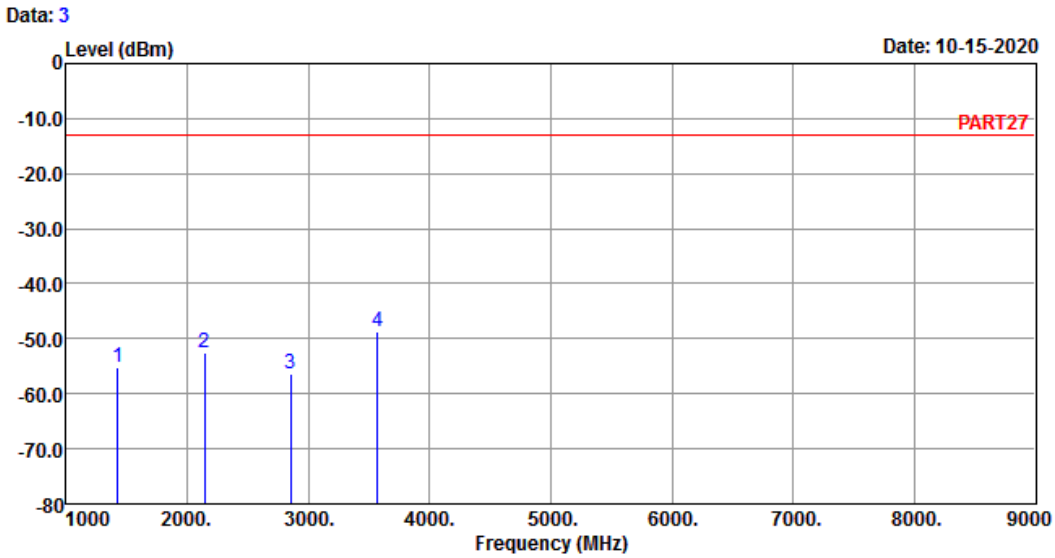


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_5M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-49.21	-37.13	-13.00	-12.08	-36.21	Peak
2	2122.50	-52.54	-42.67	-13.00	-9.87	-39.54	Peak
3	2830.00	-53.80	-45.32	-13.00	-8.48	-40.80	Peak
4	3537.50	-52.14	-44.92	-13.00	-7.22	-39.14	Peak

High Channel

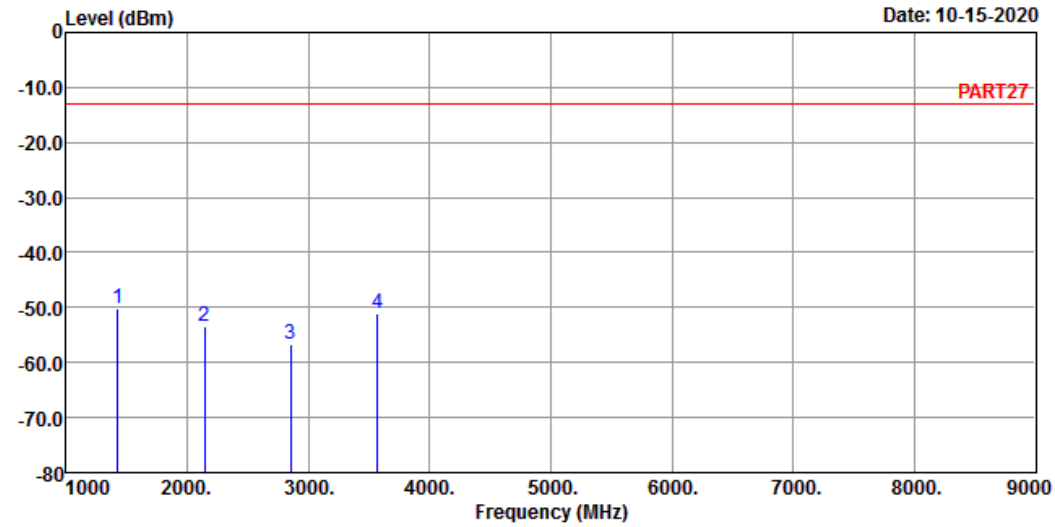
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1427.00	-55.15	-42.90	-13.00	-12.25	-42.15	Peak
2	2140.50	-52.65	-43.08	-13.00	-9.57	-39.65	Peak
3	2854.00	-56.52	-48.08	-13.00	-8.44	-43.52	Peak
4 pp	3567.50	-48.84	-41.85	-13.00	-6.99	-35.84	Peak

Data: 4



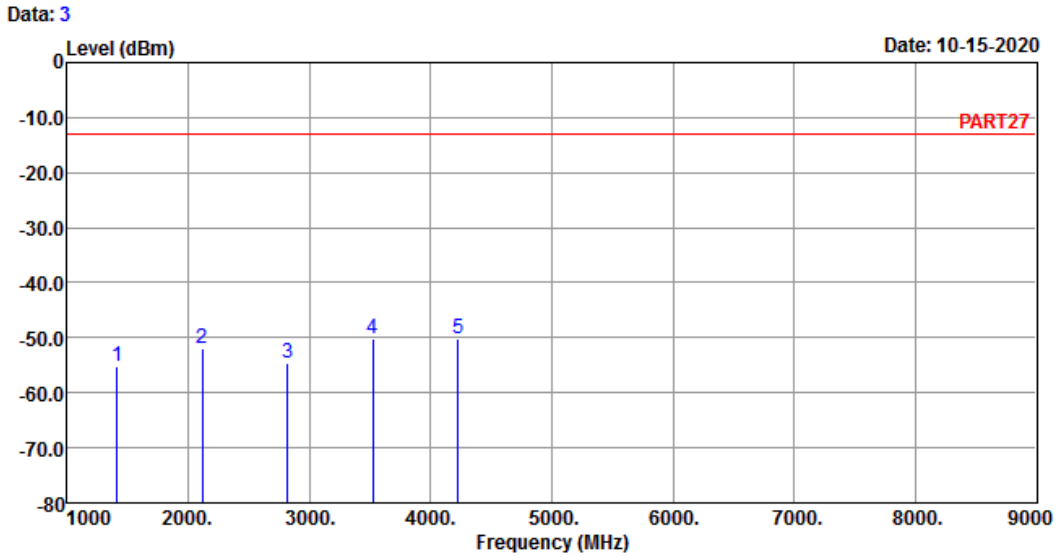
Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_5M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1427.00	-50.04	-37.79	-13.00	-12.25	-37.04	Peak
2	2140.50	-53.54	-43.97	-13.00	-9.57	-40.54	Peak
3	2854.00	-56.57	-48.13	-13.00	-8.44	-43.57	Peak
4	3567.50	-51.19	-44.20	-13.00	-6.99	-38.19	Peak

Channel Bandwidth: 10 MHz / QPSK

Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

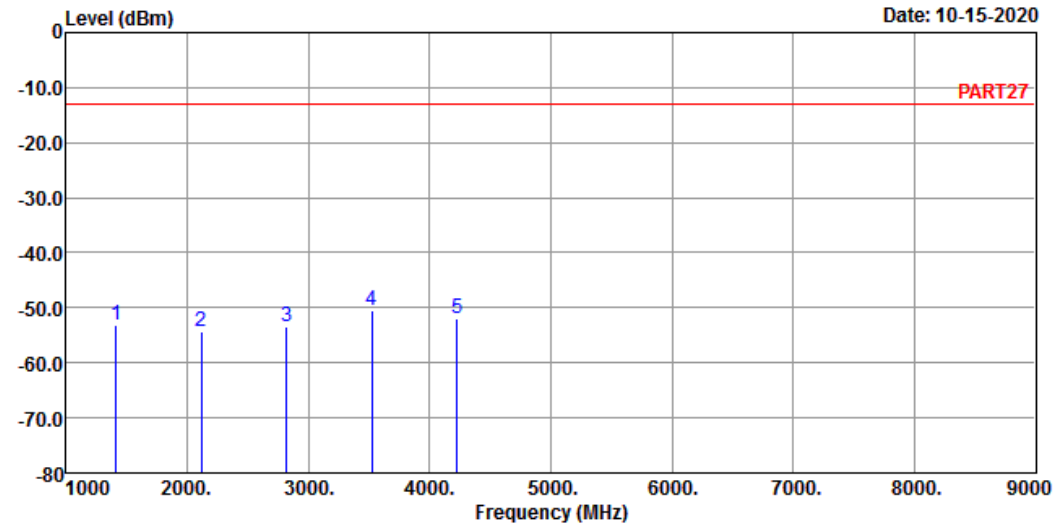


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1408.00	-55.31	-43.35	-13.00	-11.96	-42.31	Peak
2	2112.00	-51.92	-41.96	-13.00	-9.96	-38.92	Peak
3	2816.00	-54.73	-46.24	-13.00	-8.49	-41.73	Peak
4 pp	3520.00	-50.05	-42.67	-13.00	-7.38	-37.05	Peak
5	4224.00	-50.14	-44.57	-13.00	-5.57	-37.14	Peak

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

Data: 4

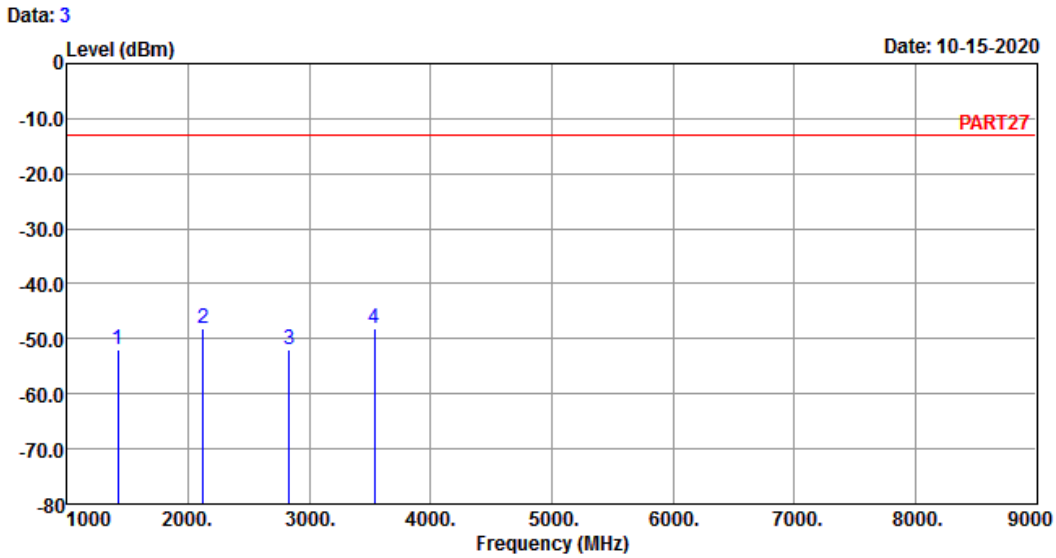


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M Link_L-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1408.00	-53.08	-41.12	-13.00	-11.96	-40.08	Peak
2	2112.00	-54.27	-44.31	-13.00	-9.96	-41.27	Peak
3	2816.00	-53.29	-44.80	-13.00	-8.49	-40.29	Peak
4 pp	3520.00	-50.54	-43.16	-13.00	-7.38	-37.54	Peak
5	4224.00	-51.91	-46.34	-13.00	-5.57	-38.91	Peak

Middle Channel

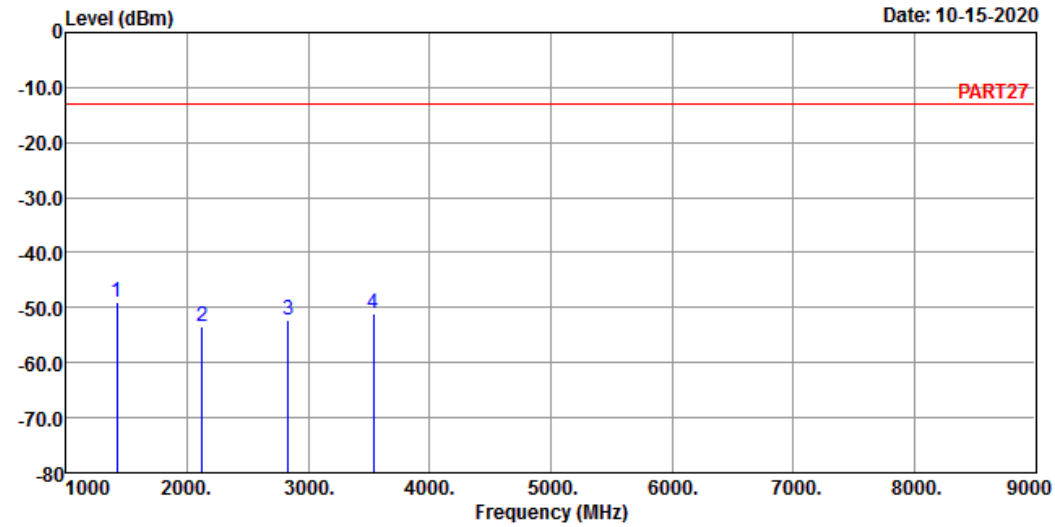
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	1415.00	-51.82	-39.74	-13.00	-12.08	-38.82	Peak
2 pp	2122.50	-48.08	-38.21	-13.00	-9.87	-35.08	Peak
3	2830.00	-51.99	-43.51	-13.00	-8.48	-38.99	Peak
4	3537.50	-48.14	-40.92	-13.00	-7.22	-35.14	Peak

Data: 4

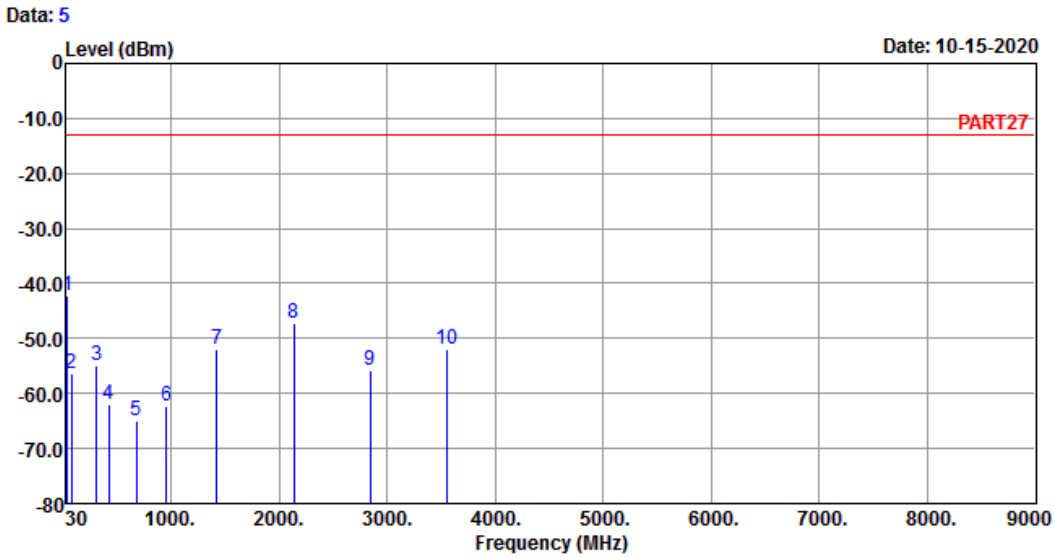


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M Link_M-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	1415.00	-49.15	-37.07	-13.00	-12.08	-36.15	Peak
2	2122.50	-53.53	-43.66	-13.00	-9.87	-40.53	Peak
3	2830.00	-52.28	-43.80	-13.00	-8.48	-39.28	Peak
4	3537.50	-50.97	-43.75	-13.00	-7.22	-37.97	Peak

High Channel

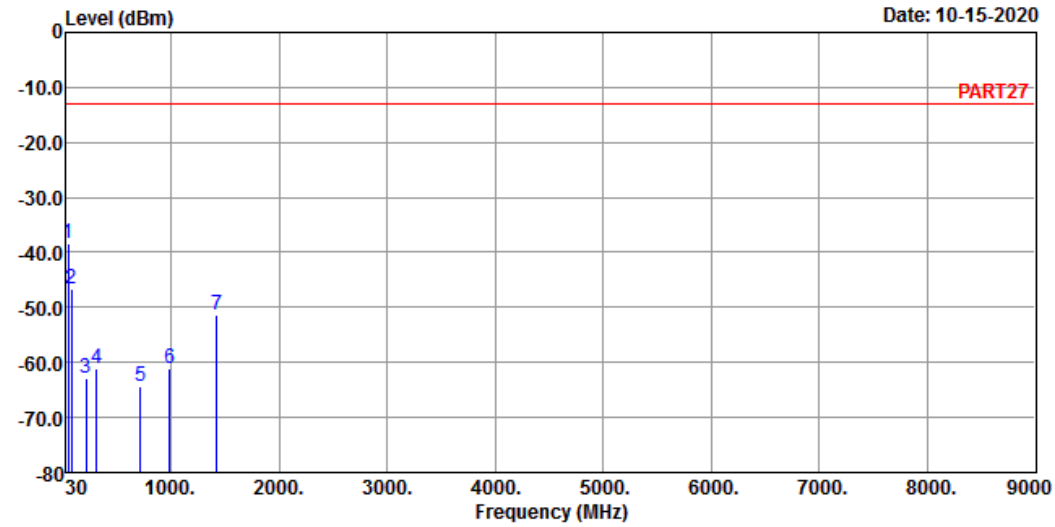
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 12 QPSK_10M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	42.61	-42.08	-41.14	-13.00	-0.94	-29.08	Peak
2	77.53	-56.44	-46.24	-13.00	-10.20	-43.44	Peak
3	308.39	-54.89	-48.01	-13.00	-6.88	-41.89	Peak
4	419.94	-62.10	-56.31	-13.00	-5.79	-49.10	Peak
5	677.96	-65.08	-64.63	-13.00	-0.45	-52.08	Peak
6	955.38	-62.39	-64.39	-13.00	2.00	-49.39	Peak
7	1422.00	-51.85	-39.66	-13.00	-12.19	-38.85	Peak
8	2133.00	-47.32	-37.65	-13.00	-9.67	-34.32	Peak
9	2844.00	-55.71	-47.25	-13.00	-8.46	-42.71	Peak
10	3555.00	-51.87	-44.72	-13.00	-7.15	-38.87	Peak

Data: 6



Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 12 QPSK_10M Link_H-CH
Tested by: Cyril Chen

	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1 pp	43.58	-38.48	-37.01	-13.00	-1.47	-25.48	Peak
2	76.56	-46.68	-36.70	-13.00	-9.98	-33.68	Peak
3	210.42	-62.76	-55.17	-13.00	-7.59	-49.76	Peak
4	308.39	-61.18	-54.30	-13.00	-6.88	-48.18	Peak
5	718.70	-64.40	-64.67	-13.00	0.27	-51.40	Peak
6	985.45	-60.98	-64.04	-13.00	3.06	-47.98	Peak
7	1422.00	-51.30	-39.11	-13.00	-12.19	-38.30	Peak

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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